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THE UNIVERSITY OF HONG KONG

AN INTERNATIONAL COMPARISON OF TENURE CHOICES

A DISSERTATION SUBMITTED TO

THE FACULTY OF ARCHITECTURE

IN CANDIDACY FOR THE DEGREE OF

BACHELOR OF SCIENCE IN SURVEYING

DEPARTMENT OF REAL ESTATE AND CONSTRUCTION

BY

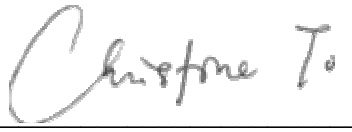
TO SIU KI

HONG KONG

APRIL 2004

DECLARATION

I declare that this dissertation represents my own work, except where due acknowledgement is made, and that it has not been previously included in a thesis, dissertation or report submitted to this University or to any other institution for a degree, diploma or other qualification.

Signed: 

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ABSTRACT

The aims of this dissertation are four.

Firstly, this dissertation examines the principles of the relationship between age, income and marriage rate with homeownership rate through the literature review and empirical study.

Secondly, it investigates whether age is a proxy for income and marriage rate in Hong Kong.

Thirdly, results derived from the first two parts are then tested against data in the US and China.

Finally, with the tested result that the derived principles apply in Hong Kong and the US do not apply in China, further investigation on the fundamental determinants of tenure choice generally applicable to all places is carried out. This dissertation concludes that the second-hand market is a fundamental determinant governing the tenure choice in different places, including places with different ideologies and housing policies.

Multiple Regression Model is used to determine the relationship between age, income, marriage rate and homeownership rate in Hong Kong. The same model is also applied to find out whether age is a proxy for income and marriage rate in the case of Hong Kong.

Critical screening and statistical data are used to analyze if the derived principles apply in the US and China, and to find out a fundamental determinant of housing tenure choice that is generally applicable.

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LIST OF ABBREVIATIONS

AGE	Age
ARCH	Autoregressive Conditional Heteroskedasticity
FHA	Federal Housing Administration
GSE	Government Sponsored Enterprise
H	Homeownership Rate
HKSAR	Hong Kong Special Administrative Region
HKMC	Hong Kong Mortgage Corporation Limited
HOS	Home Ownership Scheme
HSLS	Home Start Loan Scheme
INCOME	Income
LM	Lagrange Multipler
LTV	Loan-to-value Ratio
MAR	Marriage Rate
PRIME	Prime Rate
RENT	Rental Index
SCHP	Sandwich Class Housing Program

CHAPTER 1

INTRODUCTION

1.1 Background

The desire to own a home has grown more intense in the last decade. It can be shown by the rapidly increasing homeownership rate in the last decade. Homeownership is perceived by Hong Kong people as an essential component of household lifecycles. People are making a lot of big sacrifices in order to enter the owner-occupier market. Many of them are pressurized into buying a home in order to display status and hopefully, achieve income security. The homeownership rate in Hong Kong has been increasing in the previous 20 years, as shown in Fig 1.1. But in Hong Kong 1998, Asian Financial Crisis, has proved that the innate desire to owning a home is not true. However, the Hong Kong Special Administrative (HKSAR) Government still promotes homeownership and sets the target of achieving a homeownership rate of 70% by 2007. The HKSAR Government is promoting homeownership through various ways, such as selling of public housing and housing subsidies. As a consequence, the tenure choices will tend to be fewer.

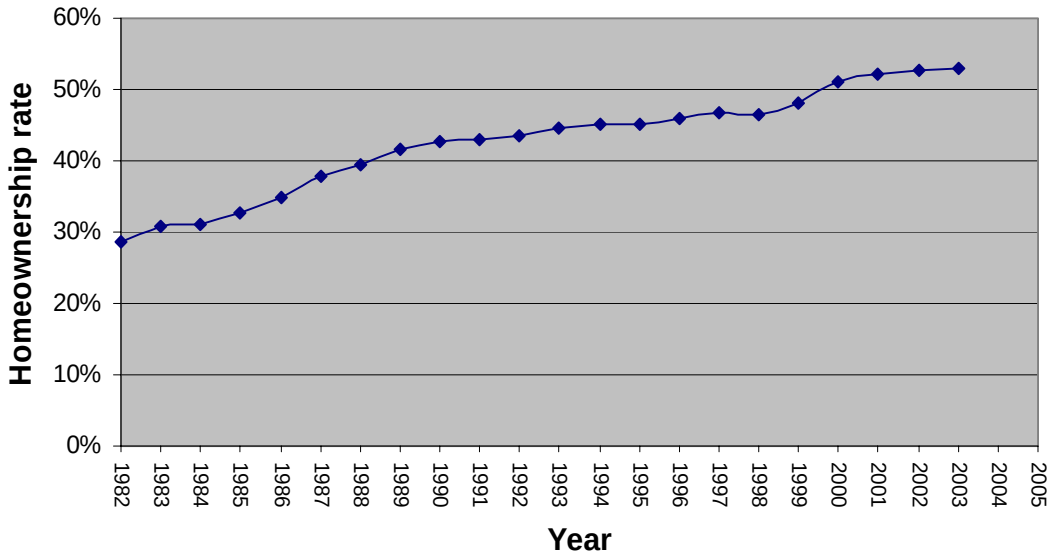

Fig 1.1 Homeownership rate in Hong Kong 1982-2003[1]

Young people are especially in a difficult situation nowadays. As education and training periods are prolonged, it becomes more difficult to delay child-birth in order to save money. Many of them are not eligible to apply for public housing or even housing subsidies as they cannot pass the income test. However, they are under the burden to repay loans borrowed from the government during university education. Further, as the inflation in last decade was high, young people are not able to save much money by decreasing expenditure. It makes it more difficult for the young people to become homeowners.

One of the reasons for this research is by understanding the determinants and the homeownership behavioral patterns of homeownership, the HKSAR Government is able

[1] Source: Hong Kong Government, Housing, Planning & Lands Bureau (2004) *Housing Statistic*. Hong Kong: Government Printer.

to formulate policy that encourages higher levels of homeownership suitably. This is undertaken with the belief that homeownership attainment generates neighborhood benefits as pertains to property upkeep, public safety, school quality, and the like.

In this paper, Hong Kong, the US and China, which are of very different characteristics are being studied. By studying the differences between the patterns of homeownership, dominating factors of homeownership that are generally applicable can thus be deduced.

1.2 Objectives

Following the purpose of the study stated above, this study has the following objectives:

1) To show the relationship between age, income, marital status and homeownership rate of residential property in Hong Kong.
2) To show if age is a proxy for income and marital status on homeownership rate.
3) To analyze and explain the homeownership-age and homeownership-income patterns of Hong Kong, the US and China.
4) To deduce the dominating factors of homeownership which are generally applicable.

1.3 Hypothesis

The hypotheses to be tested in this dissertation are:

1) The homeownership rate of residential property depends on the age of households. Homeownership rate increases with the age of homeowners.
2) The homeownership rate of residential property depends on the income of households. Homeownership rate increases with the income of homeowners.
3) The homeownership rate of residential property depends on the marital status of households. Homeownership rate increases with the marriage rate of homeowners.
4) Age is not solely a proxy for income level and marriage rate on homeownership rate of residential property.
5) Homeownership rate increases with the transaction volume of the respective second-hand market.

1.4 Methodology

This paper consists of two parts. The first part will present the relationship between age, income, marital status and homeownership rate of residential property in Hong Kong and further demonstrate that if the impact of age on homeownership is a proxy of income level and marital status. In the second part, the patterns of homeownership with age, income and marital status in Hong Kong, the US and China will be investigated. Possible explanations will be proposed. Hong Kong, the US and China are chosen in this study because the theories on tenure choice proposed by previous researches apply to western

countries only. Therefore, by studying the homeownership patterns in these three places, conclusion of whether the theories are generally applicable can be drawn.

Firstly, a brief discussion on the major determinants of tenure choice will be introduced, with special attention to age, income and marital status. The principles regarding the relationship of age, income and marital status with homeownership rate are discussed. In order to get a comprehensive understanding of homeownership to establish related principles, a detailed literature review will be employed in the first place.

A multiple regression model will be constructed to test whether age, income and marital status have a significant effect on homeownership rate, using data from 1981 to 2001. Based on the same methodology, the effect of age, income and marital status on homeownership rate is compared with the effect of income and marital status on homeownership rate. Thus, whether age is a proxy for income and marital status can be demonstrated using data from 1981 to 2001. Statistical results are analyzed and findings are summarized.

The patterns of homeownership-age and homeownership-income of Hong Kong, the US and China are compared with possible explanations proposed. The explanations are generated based on the literature review, the empirical results and the analysis of the housing markets in these three places. The principles deduced from the first part will be put into Hong Kong, the US and China for analysis purpose. The explanations will undergo critical screening. A conclusion is then drawn to summarize the findings. This is

then followed by a deduction of the dominating factors of homeownership rate that are generally applicable.

The assumption of the study is that a household buys a dwelling unit only for tenure purpose rather than speculating purpose. It is further assumed that owning and renting are mutually exclusive activities. Both owner-occupied and rental units yield housing services but they are distinct goods because their characteristics differ.

1.5 Framework

This paper is divided into 7 chapters. Chapter 1 is the introduction which presents the background, objectives, hypothesis, methodology and the framework of this dissertation.

Chapter 2 consists of reviews of literatures on how households determine their housing tenure choice. Conventional, economic, socio-economic and combined approach of tenure choice will be investigated. The principles of how age, income and marital status affect the tenure choice will be discussed in detail. This gives the basic theoretical knowledge for this study.

In Chapter 3, a statistical model to analyze the relationship of age, income and marital status with homeownership rate in Hong Kong will be proposed. It will give an account of the data used for the analysis of the relationship and the respective sources of the data.

Expectation of the results will be proposed based on the principles discovered in Chapter 2. Annual data from the year 1981 to 2001 will be collected.

Chapter 4 constructs a regression model to examine the explanatory power of age, income and marital status on homeownership rate in Hong Kong. The same methodology is used to compare the explanatory power of age, income and marital status on homeownership rate with the explanatory power of income and marital status on homeownership rate. The proposition of age is not solely a proxy of income and marital status is examined based on the statistical results.

Chapter 5 presents the patterns of homeownership-age and homeownership-income of Hong Kong, the US and China. The patterns are compared and similarities and differences are identified.

Chapter 6 offers explanations of the homeownership patterns of the three places, especially explanations for the differences. The explanations proposed are based on literature review, empirical result in Chapter 4 and the investigations into the housing markets of the three places. The explanations will undergo critical screening. Conclusions are thus resulted after the critical screening. This is followed by the deduction of the fundamental factors of homeownership rate that is generally applicable to all places.

In the last chapter, a conclusion is drawn to summarize the findings. Also, limitations of the study, better ways of doing it and future research agenda will be discussed.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter presents a literature review on tenure choice of residential property. The literature review includes theories and principles proposed by various researchers. Empirical testing and results by the researchers will also be stated. In the first part, the importance of tenure decision will be discussed. It is then followed by the investigation and critiques of the different approaches to tenure choice proposed by researchers. The determinants of tenure choice, namely age, income and marital status, will be examined.

2.2 Tenure Choice

Tenure choice of residential property is mainly classified as owner-occupation or renting. Due to the unique characteristic of residential property, the high transaction costs incurred, including high searching and information costs, prevent households from adjusting housing quantity instantaneously in response to changing demand (Muth and Goodman, 1989). Based on the same principle, households do not change their mode of tenure from time to time. Therefore, the tenure choice of users with rational economic behavior should be the mode of tenure that can maximize their utility taking the future situations into consideration (La Grange and Pretorius, 2000b).

There are numerous countries recognize the importance of homeownership and making homeownership a priority of national policy. In a number of countries, for examples the US and Australia, homeownership is named as the “dream” of the nation. In accordance with Saunders (1990), owner-occupation can help enhance the sense of belonging and political stability as people will maintain a stable society to protect their property. Weiss (2003) states that homeownership spurs the production and sales of goods and services, generating new jobs and brightening one’s economic horizon. It encourages savings and investment, promotes economic and civic responsibility, and enhances the financial security of the people. In some ways, homeownership gives people pride. It is the effect and the importance of tenure choice to a nation that make tenure choice one of the subjects of studies.

2.3 Different Approaches to Tenure Choice

There are several different approaches dealing with the choice of housing tenure proposed and used by researchers in the past, they include the convention view, human capital investment theory, economic approach, socio-economic approach and combined approach.

2.3.1 Conventional Approach

Conventional view of tenure decision assumes ontological preference for homeownership as a household tenure preference. The preference is not affected by trading off-costs and

benefits of utility preferences through choice in accordance with household resource constraints. Instead, homeownership is presented as an innately preferred tenure form.

Gray (1982) states that homeownership is a basic and natural desire and the spread of owner-occupation was satisfying deep-seated social aspirations. Further to Gray's statement, Saunders (1990) argues that the popular aspirations for homeownership had made the owning of homes a natural phenomenon. Such a natural preference to own provides important insights into tenure decisions.

The conventional view suggests that there are distinct characteristics to the rental market and homeownership market which makes people have a preference towards one over the other. There is something qualitatively different between rental and owner-occupied housing. However, this statement is criticized by the fact that the rental price and owner-occupant user costs move dependently. If rental market and homeownership market are as proposed, qualitatively different, then the dependency should not be the case (Pozdena, 1988).

Moreover, in real life, there is no important distinction between services provided by rented and owned housing. Some researchers argued that the act of owning a house provides a service that leasing the identical structure does not. Take for an example, the homeowner may enjoy the pride of ownership or feel a sense of immobility that being in the same structure would not. Although these factors may help to determine a preference for one mode of tenure over another by a given household, they do not establish a

mechanism by which the markets for rented and owned housing can come to be segmented (Pozdena, 1988).

Conventional view has pointed out that preference is one of the determinants of tenure choice to households; however, there is no mechanism by which the two modes, renting and owner-occupied, can be systematically segmented. As a result of which, the sole use of conventional view approach cannot generalize a household tenure decision.

2.3.2 Economic Approach

The second approach to the choice of tenure is based on economic factors. Under the economic approach, household will determine the tenure mode that is to the maximum of their utility. According to Becker (1976), the economic approach assumes maximizing behavior of human consumption pattern. It is assumed that the consumer unit attempts to maximize utility. Moreover, the economic approach assumes the existence of markets that with varying degrees of efficiency coordinate the actions of different participants – individuals, firms, even nations – so that their behavior becomes mutually consistent. Preferences are assumed not to change substantially over time, nor to be very different between wealthy and poor persons, or even between persons in different societies and cultures. The assumption of stable preference provides a stable foundation for generating predictions about responses to various changes. The tenure choice is assumed to satisfy the principal of consumer choice behavior of Becker so that a household, faces with the decision of optimal tenure choice, examines all the options and then chooses the best one.

In economics contexts, households choose a tenure alternative such that the level of utility derived from the choice is maximized subject to the budget constraint.

Becker's (1976) new theory of consumer behavior shifts in emphasis toward changes in prices and income and away from changes in tastes. He argues that for example if education is said to alter tastes, one cannot speak of the effects of education on the level of utility.

A lot of other researchers shared the same view as Becker (1976), Arnott (1987) assumes that households are economically rational and choose a certain type of tenure to maximize utilities within a given budget constraint. In this approach, homeownership is not just a consumption decisions by households, but is also an investment decision in competitive housing markets. Hood (1999) follows the idea that homeownership is an investment decision and applied human capital investment theory to the homeownership decision. The human capital investment theory explores the idea that any activity that increases the productivity of labor may be considered as investment in human capital. This theory involves the determining of the present value of cost and benefit streams associated with investment. The current costs incurred for homeownership is expected for future returns. An individual incurs initial costs through a home purchase in anticipation of benefits in the future. In this way, the tenure choice is based on the comparison of initial costs incurred and benefits anticipated of owning to renting. Income, assets and relative prices are considered as the most important factors affecting tenure changes (Henderson and Ioadnnides, 1987).

In reality, the assumption of stable preferences cannot stand; it is clearly that in the real world, preferences change according to how poor or how rich of a people and societies and cultures of people. Furthermore, it is believed that certain non-economic factors do systematically affect the consumer behavior, for example, people are more vulnerable to homeownership when ones get married or having children. In this way, the effects of the non-economic factors on consumer behavior are systematic and can be predicted. And the shifting of emphasis away from changes in tastes has reduced the explanatory power of Becker's (1976) model.

2.3.3 Socio-economic Approach

After the economic approach has been criticized for the lack of emphasis on tastes, there are some researchers trying to take into account non-economic factors. Some demographers, geographers and sociologists argue that tenure choice is not a simple investment or consumption decision, but is a complicated event that is inextricably linked with characteristics of households and changes in the housing market (Clark and Dieleman, 1996). Researchers of this view believe that socio-economic characteristics of households, such as age, family size and composition and trigger events which occur during the life-course such as birth of children and marriage are significant factors affecting tenure choice.

Socio-economic approach has provided another side of homeownership determinants from the above two. However, the effect of the determinants proposed by the above two

approaches on homeownership is tested to be positive by researchers. Therefore, there is no denial that tenure choice should be determined by the determinants proposed in the two approaches mentioned above.

2.3.4 Combined Approach

After going into another extreme of solely considering the socio-economic characteristics, Hsieh (2000) combines economic and socio-demographic determinants on tenure choice. He further groups the determinants that influenced the nature of tenure choice into three categories; they are 1) the user cost of capital, 2) constraints and 3) preferences. The user cost of capital is reflected in the relative price of owning versus renting. Constraints are concerned about employment, mobility and housing policy. Further, a household's preference for owner-occupation or renting is expressed through different household structures, socio-economic backgrounds and household formation.

1) User cost of capital

The relative level of rental price and user costs of occupancy is used as a powerful explanation for tenure choice. Lots of the researchers (Rosen and Rosen, 1980; Fallis, 1985; La Grange and Pretorius, 2000b) have looked into the user cost of housing capital and rental price. They agreed that the cost of ownership is usually associated with the expected after-tax costs associated with mortgage payment, opportunity costs on equity, depreciation and maintenance minus capital gain. The

cost of ownership and the rental price are compared in a one-year model. Through establishing the model, those with relatively low cost of renting will choose to rent while those with a relatively high cost of renting will choose to buy.

Hood (1999) further compares the benefits and costs stream of rental and homeownership. The costs that are directly related to the purchase of a house are down payment, mortgage payments, insurance policy and special fees including closing and attorney costs. For example, when mortgage rates are low, an individual is more likely to invest in homeowning. To generalize, the decision rule is that a prospective homeowner should invest in homeowning if the net present value of the benefits is greater than zero. That is:

$$V_p \text{ (Net Benefits)} > 0$$

Lee (1993) suggests the reason for more owner occupation is the small differences between the rental index and house price index. People are paying monthly rent which was actually the same amount of the mortgage payment. Lee also mentions that tenure neutrality i.e. same rental and price index, has caused more home buying.

It has been tested that a lot of determinants under the category of “user cost of capital” has significant effect on homeownership. It is thus reasonable to include this category of determinants in the tenure choice decisions.

2) Constraints

Housing mobility is a constraint, yet another aspect of housing tenure decision. Modern view of tenure decision believes that the transaction cost of homeowners and renters are different on moving. Therefore, households with different expected length of stay will choose different tenure choice.

Shelton (1968) and Fallis (1985) indicate that homeowners faced higher transaction costs of selling and moving than renters. Based on the difference in transaction cost, households that will move frequently, for example the young will tend to be renters. Elderly homeowners may remain in their homes because of very high dislocation costs of shifting to a rented residence. Therefore, the elderly will tend to remain as homeowners.

Pickvance (1973) develops a model of path analysis to study the relationship between tenure and mobility. The research emphasizes that the simultaneity of housing and mobility decisions by treating them as aspects of a semi-Markov decision process. The key element of decision is the length of time that a household stays in different dwelling units.

Borrower's constraint is another constraint to homeownership. In general, borrowing constraints can be classified into wealth constraints and income constraints. Wealth constraints refer to the requirement for a huge amount of

down payment at one time. Income constraints refer to the requirement of the ratio of current income to the installments of borrowers. Households facing borrowing constraints may choose to purchase a home providing less optimal services or to rent rather than own. In this way, wealth constraints create a barrier to enter into homeownership while income constraints prevent someone from remaining in homeownership (Linneman and Wachter, 1989). Hsieh (2000) also points out that the level of mortgage rationing imposed by the lender is one of the most common constraints limiting households to enter owner-occupied market. Example of the level of mortgage rationing is the loan-to-value ratio. It is believed that some households may be refused access to owner-occupied housing because of their inability to obtain a loan because of the low loan-to-value ratio. Linneman and Wachter (1989) make use of microdata to directly quantify the impact of mortgage underwriting criteria on individual homeownership propensities. The results showed that wealth and income constraints both reduced homeownership rate. The research indicates that even in well-developed capital markets, the presence of borrowing constraints adversely affected homeownership propensities.

Haurin *et al* (1997) analyze factors affecting the tenure choice of young adults, highlighting the impact of lender-imposed borrowing constraints. They found that homeownership tendencies are quite sensitive to potential earnings, cost of owning relative to renting and especially borrowing constraints. In Haurin *et* al's research, the borrowing constraints reduced the probability of ownership by 10 to 20 percentage points. Dolde and Tobin (1971) classify the population into two

income classes and attempt to capture existing differences in access to capital markets by using a microeconomic simulation model. They found that borrowing constraints bound on poorer segments of population, as well as on those in younger age groups.

Both Haurin *et al* (1997) and Dolde and Tobin (1971) point out that younger age groups are more vulnerable to be affected by borrowing constraints. This is because younger age groups have less wealth and income than older age groups in general. Therefore, determinants concerning borrowing constraints should be included in the consideration of tenure choice.

3) Preferences

Preferences have long been considered as an important variable in tenure decision. Usually, household income, race, age, sex, martial status of household head and household size are adopted as independent variables to estimate the effects of preferences on tenure decision. Previous studies constructed regression model by employing linearly additive independent variables with dichotomous (renting and owning) dependent variable.

Kain and Quigley (1972) examine the effect of income, race, age, marital status and family size on the probability that a household will own its home for four West Coast cities and St. Louis respectively. Carliner (1974) extends their work to

the nation as a whole. All of them showed that homeownership rate were highly correlated with all socio-economic variables suggested in their research.

This section mainly focuses on three determinants of tenure choice; they are martial status, age and income.

- *Marital Status*

Marital status is a major determinant for the preference of tenure choice of a household. Hood (1999) states that married couples are often interested in "settling down" and are therefore less mobile than unmarried individuals. Moreover, married couples often forecast a future with children and will want to provide a stable environment to raise them. Therefore marital status has a strong influence in the homeownership decision.

Knight and Eakin (1998) are of the view that family formation and growth are the primary reasons for buying a first home and for trading up to larger homes during the life cycle.

Based on the above findings, married couples are more likely to be homeowners.

- *Income*

Income has long been considered of imposing a great influence on tenure choice. La Grange and Pretorius (2000b) try to explain the affordability-tenure relationship. The concept of affordability is defined as “ability to pay” for housing services. Rental and ownership affordability are associated with indicator frequently being the rent-income ratio and the price-income ratio. Household tenure decisions, based on affordability, incorporate unique household preferences.

Hsieh (1997) and Hood (1999) find out that income plays a significant role in households’ tenure decisions. Hsieh found out that households that have lower incomes are more likely to choose social housing or private renting rather than owner-occupation. While Hood explained that the net family income has both a direct and indirect influence on the homeownership decision. It is related directly in that as the net income rises within a family, the taste for homeownership also rises. On the other hand, a higher income has more potential to cover the initial costs incurred by homeownership. Income is indirectly related because as income increases, the costs become an increasingly smaller proportion of the income. This creates greater value of investment in a non-taxed asset for investors in higher income brackets.

It is believed that homeownership is more likely for high income group than low income group. In short, homeownership increases with income.

- *Age*

Age is another important determinant of tenure choice. Hsieh (1997) finds out that younger and single household heads are more likely to choose private renting compared to owner-occupation. He has also found out that the homeownership is concentrated in the middle age group of households and decline in older households. There are two ways in which age is used in determining its relationship with tenure choice. One way is that effect of age is solely a proxy for income level and marital status. The other way is that the determinant age carries a certain impact on its own.

There have been a number of studies using age as a proxy for marital status and income level to explain homeownership pattern. Hood (1999) explains that age is major determinant of homeownership for several reasons. First, older households have higher incomes. These households have spent more years in the workforce and their incomes have most likely risen with their level of experience. They are more financially prepared to cover the cost of a housing investment and have more certainty of income. As a household gains increasingly more experience in the workforce or with a particular company, it is more likely that it will, at least, maintain a certain level of outcome. In other words, as a household's experience increases, it is less likely to lose its income altogether in near future. Thus, older households are more likely to commit to homeownership. Also, older households have more wealth. This means that an investment in housing is more easily

diversified and a smaller proportion of the wealth of older households contributes toward the housing investment.

Apart from the direct relationship between old age and wealth and income, Chiuri and Jappelli (2000) find out the impact of the other economic factors on homeownership at different ages. They found that the impact of the down payment is largest in the youngest age group and the down payment effect tends to disappear at older ages. They specify that reducing the down payment from 50 to 20 percent increases the probability for the young to become homeowners by nearly 10 percentage points. In addition, they explain the homeownership pattern in two aspects, namely wealth and composition of population. They propose that the timing of household formation interacts with homeownership. In particular, the average age at marriage and the arrival of children for many households coincides with plans to buy a house.

In this way, age is used as a measure for the income and marital status, therefore the effect of age on homeownership is just a substitute for the impact income and marital status on homeownership.

However, it has been criticized that there is more to age than just a proxy for income level and marital status. Goodman (1986) claims that although age should have a major impact on tenure choice through permanent income, it has an independent positive impact when permanent income is held constant. This means

the effect of age on homeownership is independent of the factor of income. In addition, Hood (1999) states that older households are less mobile due to their age and they tend to relocate less often than younger households. Therefore, it makes homeownership more attractive to people of old age.

Black and Stafford (1988) further point out that the effect of age on homeownership may be a psychological effect. Different age groups have different kinds of perception to homeownership. One example is that people of certain age group may find that renting is a more suitable tenure because the renters may not mentally or physically ready to cope with the trouble of looking after a house. They may not financially fit to cope with the cost of maintenance and repair.

Mudd *et al* (2001) try to explain age-homeownership pattern in terms of the duration of receiving education. In Mudd *et al's* study, it is found that in recent decades, young people's participation in education increases rapidly deal to the increasing opportunities and aspirations. The longer periods which young people are spending in post-secondary education or training, may have raised the age young adults enter the workforce and achieve the income flows that enable them to accumulate equity to enter into homeownership

To conclude, there are two sides to age on homeownership; one is that it acts as a proxy for income and marital status, the other one is age in itself. In general, when

age acts as a proxy for income and marital status, homeownership rate increases with age. It can be deduced by the fact that homeownership rate increases with increase in income and marriage rate. When age is in itself, the effect of age on homeownership is difficult to predict.

2.4 Tenure Choice across Different Nations

Hsieh (1997) find out that the importance of the determinants of tenure choice varies between countries. For instance, different housing policies in different countries may have significant impacts on household's tenure decisions. It is suggesting that it is not enough to just depend on the economic and socio-economic determinants to predict how tenure choice varies with the change in determinants under different systems of different countries. However, Hsieh (1997) has not done any further studies on this issue. It is worthwhile to consider what factors of a country affect the homeownership and the weightings of importance of these nation factors compared with the demographic factors.

Chiuri and Jappelli (2000) investigate the homeownership-age profile in different countries. Chiuri and Jappelli state that early literatures have pointed out that in some countries like Australia and Canada, the United States or the United Kingdom, homes are purchased early in life and age-profile increases sharply at young ages. In other countries, such as Austria, Italy and Spain, homes are purchased more gradually over the life cycle and the average age of first purchase is reached only in the late thirties or forties. Chiuir and Jappelli have selected data from fourteen counties, which include Australia, Austria,

Belgium, Canada, Finland, France, Germany, Italy, Luxembourg, Netherlands, Spain, Sweden, United Kingdom and United States for international comparison. The paper found out a general trend that mortgage market imperfections distort the age-tenure profile, inducing people to save when young and to postpone home purchases later in life.

It is noted that the homeownership patterns in different countries is a subject worthwhile to study. It can be observed that the countries studied in previous researches are relatively homogenous, and have excluded countries of transition economies such as Poland, Russia and China. The general trend found is thus based only on data coming from the homogenous countries and are only applicable to a certain type of countries only.

2.5 Conclusion

In this chapter, a literature review on tenure choice is given. Tenure decision is not only an important decision of the households, but may be a political objective used to maintain social stability. It is because of the widespread effect of tenure choice that enables it to be an area of studies.

Conventional, economic and socio-economic approaches to tenure choice are found to be rejected based on various reasons and economic theories. Each approach has separately identified certain important determinants of housing tenure choice. In contrast, the combined approach is a combination of the approaches and identifies the important determinants of tenure decision. This method is the most comprehensive approach to

housing tenure choice. Homeownership pattern is found to be different among countries, however, no fundamental determinants are found that can be generally applicable to all countries instead of just western countries.

CHAPTER 3

METHODOLOGY AND DATA

3.1 Introduction

In this chapter, an account of the methodology, data and its sources will be given for the analysis of i) the relationship between age, income, marital status and homeownership rate and ii) the impact of age on homeownership in addition to income and marital status. The methodology and the statistical tools adopted would be presented first. Each determinant will then be discussed. It is then followed by the expectations and justifications of the results.

3.2 Model Specification

By considering different statistical model, multiple regression model is adopted as the methodology for determining the relationship.

3.2.1 Regression Model

Regression analysis is a technique adopted to examine the relationship between dependent variable and a set of independent variables. Since tenure choice is a complicated decision which involves different aspects, therefore the empirical study

carried out in this paper contains more than one independent variables. Consequently, the model chosen is a Multiple Linear Regression analysis.

With multiple regression, more than one independent variables can be incorporated into an equation. This model is chosen because of two reasons. First, it almost inevitable offers a fuller explanation of the dependent variable, since the phenomena of homeownership is not a product of a single cause. Second, the effect of an independent variable is made more certain, for the possibility of distorting influences from the other independent variables is removed.

In the first analysis, a regression equation is first constructed. Through this equation, it is important to find out which independent variables give significant relationship with the homeownership rate. Second, if there is any, its level of significance. Thirdly, it is the explanatory power of the independent variables on the homeownership rate. Lastly, it is to find out whether the relationship between each of the independent variables and the homeownership rate is positive or negative.

In the second analysis, another regression equation is constructed. The regression equation constructed in this analysis is the same as the one in analysis one with the independent variable AGE missing. Then a comparison of explanatory power is made between the first equation and the second equation.

3.2.2 Multicollinearity

The problem of “multicollinearity” often exists in independent variables. The problem arises when two or more of the independent variables in an equation are highly correlated. The presence of multicollinearity can be checked by a table zero-order correlation matrix. However, as it is stated by Eastman (1984) that there is no real, genuine solution to the problem of multicollinearity as it appears in econometric research. The problem of multicollinearity is considered as one of the limitations of the empirical study.

3.2.3 Autocorrelation

This is a Lagrange Multipler (LM) test for Autoregressive Conditional Heteroskedasticity (ARCH) in the residuals (Engle 1982). This particular specification of heteroskedasticity is motivated by the observation that in many financial time series, the magnitude of residuals appeared to be related to the magnitude of recent residuals. Ignoring ARCH effects may result in loss of efficiency.

ARCH Test: (Autoregressive Conditional Heteroskedasticity)			
F-statistic	1.838159	Probability	0.179973
Obs*R-squared	3.589614	Probability	0.166160
Test Equation:			
Dependent Variable: RESID^2			
Method: Least Squares			
Sample(adjusted): 3 30			
Included observations: 28 after adjusting endpoints			
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000689	0.000159	4.343658	0.0002
RESID^2(-1)	-0.063097	0.184616	-0.341775	0.7354
RESID^2(-2)	-0.353451	0.186426	-1.895930	0.0696
R-squared	0.128201	Mean dependent var		0.000491
Adjusted R-squared	0.058457	S.D. dependent var		0.000529
S.E. of regression	0.000513	Akaike info criterion		-12.21024
Sum squared resid	6.59E-06	Schwarz criterion		-12.06750
Log likelihood	173.9433	F-statistic		1.838159
Durbin-Watson stat	1.862120	Prob(F-statistic)		0.179973

Table 3.1 Empirical result of the LM test

The above illustrated that the P-value for residual is 0.0696; it means that the relationship between the residual and the residual of 2 time lags is significant at 90% confidence level in this empirical analysis. In this case, the variance is a non-constant variance and correlates with two units before. This model exhibits second order correlation. Therefore, ARCH is used to estimate the true estimated parameters.

3.2.4 Autoregressive Conditional Heteroskedasticity (ARCH)

As there is second order autocorrelation detected, ARCH is adopted to estimate the true parameters of the regression equations. ARCH model is specifically designed to model

and forecast conditional variances. This method is especially popular with time series data.

3.2.5 Statistical Techniques

In order to investigate whether the independent variables have an impact on the dependent variable, the study is going to test i) the significance of the effect of the independent variables on the dependent variable, ii) the change in dependent variable associated with a unit change in the independent variables, iii) the explanatory power of the independent variables on the dependent variable and iv) the significance of all the independent variables on the dependent variable.

1) P-test

P-test will be employed to show whether the independent variable has a significant effect on the dependent variable. It is assumed that the independent variable will be classified as insignificant, i.e. statistically equal to zero, if its level of significance is higher than 5%. If the results showed that the p-value is less than or equal to 0.01, then the independent variable is significant at 99% confidence level. On the other hand, if p-value is less than or equal to 0.05, then the independent variable is significant at 95% confidence level.

2) Estimated Coefficient

In addition, estimated regression coefficient will be considered to observe the impact of the independent variable on the dependent variable. This coefficient will specify the individual effect of how movement in each independent variable induces movement in the dependent variable, while holding other constant. A negative sign suggests that an inverse relationship between the independent variable and the dependent variable and vice versa.

3) Coefficient of Determination (R^2)

In order to find out the explanatory power of the independent variable on the dependent variable, the coefficient of determination R^2, should be determined. The coefficient of multiple determination describes the proportion of the variation in the dependent variable "explained" by the variation in the independent variables. The result shows how well the regression model explains the fact. The coefficient of determination ranges from 0 to 1. If R^2 is equal to 1, it means 100% of the change in the dependent variable is due to changes in the independent variables. R^2 increases as more independent variables are added to the equation irrespective of whether these variables are significant.

4) F-statistics

F-statistics is used to test the significance of the R^2 statistic. The R^2 follows an F distribution with k and N-k-1degree of freedom, where N is the number of observations and k is the number of independent variables. It is employed to test the null hypothesis that none of the independent variable helps to explain the variations of the dependent variable about its mean, i.e.

$$b_i=0 \text{ for all } i$$

This gives an additional evidence to show the significance of the results.

3.2.6 Data Specification

As the research data is obtained from Population Census and Population By-census, which was obtained from home-visits, the households are definitely the occupiers and self-users of the premises. The probability of properties being vacant and purchased for the purpose of speculation is excluded in this study. The households in the sample data are assumed to purchase properties solely for tenure purpose. The data used are not based on single transaction, but it is looking into the general trend in Hong Kong. Therefore, the data used is a compiled one, compiling of all the data in Hong Kong.

As it is mentioned in Chapter 2, there are a large number of determinants of homeownership rate. After making reference to the previous studies and the availability

of data, six determinants are inputted into the model. The chosen determinants are age, income, marital status, loan-to-value ratio, prime rate and rental index.

This paper presents the effect of age, income and marital status on homeownership rate in two aspects: their explanatory power on housing tenure pattern and the impact of age in addition to income and marital status. Two empirical investigations will be carried out. In the first study, the analysis will be on whether age, income and marital status have a significant effect on the change of the homeownership rate. Annual data from 1981 to 2001 will be collected. In the second study, analyze will be on the impact of age on homeownership rate in addition to income and marital status. Annual data from 1981 to 2001 will be collected.

In the following context, the sources of the homeownership rate, age, income, marital status, loan-to-value ratio, prime rate and rental index will be discussed. The details of the data will be presented in Appendix I.

3.2.7 Dependent Variable

1) Homeownership Rate (H)

Homeownership rate-age data are collected from the Population Census and Population By-census from the Census and Statistics Department. Data of year 1981, 1986, 1991, 1996 and 2001 are collected. The definition of homeownership

rate is the number of owner-occupier households over the total number of households. It includes both the public and private households. The homeownership rate is divided among different age groups, 5 years as an interval. However, there are limitations to the data, there maybe presence of co-owners which is not separated out. Moreover, the registered owner may not be the one paying money to buy the housing property. However, it is assumed that the effects of the limitations are even out in different age groups and different years.

3.2.8 Independent Variables

1) Age (AGE)

The age used is the average of the age group used in the homeownership rate-age, income-age and marital status-age data from the Population Census and Population By-census from the Census and Statistics Department. Data of year 1981, 1986, 1991, 1996 and 2001 are collected. The age range is usually grouped in a 5 years interval, the single figure of age used in the regression model is by adding the lowest and highest age in the group and divided by 2, for example, for age group 20-24, the single figure inputted into the model is (20+24)/2, that is 22. Age group 0-19 is disregarded, as the people in this group are too young to be homeowners. For age group 65+ and 55+, age 70 and 60 is used respectively, it is calculated with reference to the average life-span of Hong Kong people. As the average life-span for people at birth in recent years is about 75, the age group is

thus 65-75 for the old age, and 70 is the average value inputted into the equation. The average life-span for people at birth in 1981 is about 65, the age group is then 55-65 for the old age, and therefore the average value of 60 is inputted into the equation.[1]

2) Income (INCOME)

Income-age data are collected from the Population Census and Population By-census from the Census and Statistics Department. Data of year 1981, 1986, 1991, 1996 and 2001 are collected. As the income level is expressed in real term, it should be deflated. There are two common ways to show change in general price level: implicit GDP deflator and Consumer Price Index. The data used in this study is deflated by the Consumer Price Index due to the readily availability of Consumer Price Index. The income is the median monthly income from main employment of the working population in different age groups. The data include both genders.

3) Marriage Rate (MAR)

Marital status-age data are collected from the Population Census and Population By-census from the Census and Statistics Department. Data of year 1981, 1986, 1991, 1996 and 2001 are collected. The marital status rate is derived by dividing

[1] Hong Kong Government, Census and Statistics Department (2004) *Expectation of life by birth at sex.* Hong Kong: Government Printer

all the people who are currently married by the whole population in different age groups. Only people in the “Married” status are categorized as married; for people who are in the status of “Widowed”, “Divorced/Separated” and “Never Married” will all be categorized as “Unmarried”. The rate incorporated people of both gender.

4) Loan-to-value Ratio (LTV)

The LTV ratio is the loan amount expressed as a percent of either the purchase price or the appraised value of the property. The higher the LTV, the less cash a borrower is required to pay as down payment. The loan-to-value ratio is provided by the Hong Kong Monetary Authority. 70% ratio was adopted by the banking industry after November 1991 as the maximum loan to value ratio. Before that, the LTV ratio was determined by banks' own credit lending policy, which is assumed to be 90%.

5) Prime Rate (PRIME)

The prime rate is the interest rate charged by banks to their most creditworthy customers; therefore it is also called the best lending rate. The rate is almost always the same amongst major banks. Prime rate for year 1981, 1986, 1991, 1996 and 2001 are collected from the Hong Kong Monetary Authority. As there are changes in the prime rate at the middle of the year, the prime rate inputted into

the model is the weighted average according to the duration of a particular prime rate in a particular year. For example, if there are 2 months of which the prime rate is 10% and the rest 10 months is 12%, then the prime rate computed is [2(10%)+10(12%)]/12, which is 11.67%.

6) Rental Index (RENT)

Rental index measures value changes by reference to the factor of rent divided by rateable value of the subject properties. Rental index for private domestic of all classes are collected from the Hong Kong Property Review from the Rating and Valuation Department of years 1981, 1986, 1991, 1996 and 2001. The component index (the index for a property class or grade) has been derived from analysis of all transactions effective in a given period. The composite index for a certain type of premises is compiled by calculating a weighted average of the component indices. For domestic premises the weight for rental index is based on the number of transactions effected in the current and previous 11 months. The rental index used in this study is the composite index for all domestic property.

3.2.9 Expectation of Results

1) Age (AGE)

Generally, age is seen as a measure for one's income and marital status. Income and marriage rate are expected to increase with the age of the households. From the literature review in Chapter 2, homeownership rate increases with income and marriage due to increase in affordability, stability of income and the desire to settle down after marriage. Therefore, the coefficient of age is expected to be positive due to its nature as a proxy for income and marriage rate. However, for the proposition that age is not just a proxy for income and marital status, the effect of age alone has no agreed principle up to now. Therefore, the expected result is solely based on the principles of income and marital status.

2) Income (INCOME)

Income in this case indicates an individual's affordability to own a property. Income is related to the money needed to enter the homeownership market and the subsequent payments. It is expected that the coefficient of income is positive.

3) Marriage Rate (MAR)

From the literature review in Chapter 2, it is found that married couples are often interested in "settling down", creating their own family and home and are less mobile. Taken into consideration the above arguments, homeownership rate is expected to increase with marriage rate; the coefficient of marriage is expected to be positive.

4) Loan-to-value Ratio (LTV)

Loan-to-value ratio determined the amount of initial payment (down payment). A low loan-to-value ratio requires a high initial payment, which would deter one from entering the owner-occupied market. Therefore, loan-to value ratio is expected to be positively correlated with homeownership rate.

5) Prime Rate (PRIME)

Prime rate is related to the interest rate banks lend to the mortgagor. An increase in the interest rate increases the cost of homeownership and decreases homeownership rate. It is therefore expected that the coefficient is negative.

6) Rental Index (RENT)

Rental index is the rent over the rateable value. It is basically an indicator of the rent. An increase in rental index may indicate the rent is high when compared with its rateable value. It implies that owning is a better choice than rent in economic term. Therefore, rental index correlates negatively with the homeownership rate.

3.3 Critical Screening

Apart from using regression model to perform empirical analysis, critical screening is another important methodology for making arguments and explanations when empirical data is not involved. As there is no empirical data to test the hypothesis and propositions, the arguments and explanations put forward should be critically reviewed. Critical screening can be mainly done through the process of collecting relevant propositions and then finding examples and counter-examples. Making use of counter-examples is a useful methodology to test the validity of the propositions. By going through the process of counter examples, only arguments and propositions with ground can stand.

3.4 Conclusion

Multiple regression model is adopted for testing the applicability of the principles derived from the literature review to Hong Kong. The effect of the age, income and marital status

on homeownership rate and the effect of age in addition to the effect of income and marital status on homeownership are tested through the regression model. Critical screening is employed to test the arguments and explanations proposed for the homeownership patterns in Hong Kong, the US and China.

CHAPTER 4

STATISTICAL ANALYSIS FOR HONG KONG

4.1 Introduction

In this chapter, regression methodology is adopted to analyze i) the relationship between age, income, marriage rate and the homeownership rate of residential property in Hong Kong and ii) whether age is just a proxy for income and marriage rate. Annual data of years 1981, 1986, 1991, 1996 and 2001 are studied empirically. Finally, the results will be analyzed based on the empirical study.

4.2 Regression Analysis

In the first analysis, the relationship between age, income, marriage rate and the homeownership rate of residential property in Hong Kong will be studied. In this regression model, the homeownership rate of residential property will be assigned as the dependent variable while the age, income and marriage rate will be assigned as independent variables. Annual data of years 1981, 1986, 1991 and 2001 is adopted in the model.

In this linear regression model, we have employed residual Lagrange Multiplier (LM) Test to test for autocorrelation. As there is second order autocorrelation in this case,

Autoregressive Conditional Heteroskedasticity (ARCH) is used to estimate true function in the regression equation.

$$HR = a + b\text{AGE} + c\text{INCOME} + d\text{MAR} + e\text{RI} + f\text{LTV} + g\text{Prime} + h$$

Where

HR is the homeownership rate of residential property

AGE is the age of the households

INCOME is the income of the households

MAR is the marriage rate of the households

RI is the rental index

LTV is the loan-to-value ratio

PRIME is the prime rate

a is the constant term

b is the estimator of true unobservable coefficient of AGE

c is the estimator of true unobservable coefficient of INCOME

d is the estimator of true unobservable coefficient of MAR

e is the estimator of true unobservable coefficient of RI

f is the estimator of true unobservable coefficient of LTV

g is the estimator of true unobservable coefficient of PRIME

h is the stochastic error term

In the second analysis, the relationship between age, marriage rate, income and homeownership rate is compared with the relationship of homeownership rate with marriage rate and income level. The independent variable AGE is removed from the regression equation. The regression equation of this model is as follows:

$$HR = a + bMAR + cINCOME + dRI + eLTV + fPRIME + g$$

Where

HR is the home-ownership rate of residential property

MAR is the marriage rate of households

INCOME is the income of households

RI is the rental index

LTV is the loan-to-value ratio

PRIME is the prime rate

a is the constant term

b is the estimator of true unobservable coefficient of MAR

c is the estimator of true unobservable coefficient of INCOME

d is the estimator of true unobservable coefficient of RI

e is the estimator of true unobservable coefficient of LV

f is the estimator of true unobservable coefficient of PRIME

g is the stochastic error

4.3 Analysis 1

4.3.1 Empirical Results

After the construction of the methodology, this section will present the empirical results of the relationship between homeownership rate, age, income and marriage rate. Table 4.1 presents the empirical Analysis 1.

Dependent Variable: HR
Method: ML – ARCH
Sample(adjusted): 1 30
Included observations: 30 after adjusting endpoints
Convergence achieved after 5 iterations

	Coefficient	Std. Error	z-Statistic	Prob.
AGE	0.004002	0.000574	6.976917	0.0000
INCOME	4.80E-05	4.95E-06	9.686138	0.0000
MAR	0.007099	0.036496	0.194503	0.8458
LTV	0.185856	0.093472	1.988355	0.0468
RI	0.000128	0.000291	0.440899	0.6593
PRIME	-0.237107	0.154971	-1.530011	0.1260
C	-0.285109	0.109156	-2.611940	0.0090
Variance Equation				
C	0.000135	0.000573	0.236614	0.8130
ARCH(1)	0.149828	0.545741	0.274540	0.7837
GARCH(1)	0.599976	1.467635	0.408804	0.6827
R-squared	0.965197	Mean dependent var		0.367633
Adjusted R-squared	0.949536	S.D. dependent var		0.118507
S.E. of regression	0.026622	Akaike info criterion		-4.126312
Sum squared resid	0.014174	Schwarz criterion		-3.659246
Log likelihood	71.89467	F-statistic		61.62925
Durbin-Watson stat	1.296204	Prob(F-statistic)		0.000000

Table 4.1 Regression result for Analysis 1

The p-value for age, income and marriage rate are 0, 0 and 0.8458 respectively. Therefore, both the age and income are significant at 99% confidence level, while the marriage rate is insignificant. For the rest of the independent variables, both the rental index and the prime rate are insignificant while the loan-to-value ratio is significant at 95% confidence level. The F statistics is 0, which means that null hypothesis that none of the independent variables helps to explain the variations of the dependent variable about its mean is rejected.

The estimated coefficients of age and income are positive, they are 0.004, 4.80 $x10^{-05}$ respectively. This investigation shows that, in general, the increase in age and income level cause the homeownership rate to increase and vice versa. An increase in one unit of age, income level and marriage rate will cause 0.004 and 4.80 x 10^{-05} unit change in homeownership rate respectively. The coefficient of loan-to-value ratio is 0.093, which is a positive figure; this means that an increase in loan-to-value ratio causes the homeownership rate to increase.

The adjusted R^2 is 0.95 in this case, this means the independent variables, accounts for 95% of the variation in the dependent variable, which is the homeownership rate.

4.3.2 Analysis of Results

The empirical results for age and income level are as expected. However, for marriage rate, it is out of expectation that it is insignificant. It is because the effect of marriage rate

is superseded by the effect of age. It can be seen from the regression analysis that after the independent variable AGE is removed, marriage rate becomes significant. Hence, the first two hypotheses are only partly confirmed. As the coefficients of age, income level and marriage rate (with the condition that AGE is removed) are all positive, an increase in the age, income level and rate of marriage cause the homeownership to increase.

However, both the rental index and the prime rate are insignificant. Only the loan-to-value ratio is significant. It means that loan-to-value ratio is one of the barriers for the people to enter into the property market in Hong Kong. For rental index and prime rate, their effect on the homeownership rate is insignificant. Therefore, the effect of the initial installments is greater than the following payments as interest is not significant. Further, the ratio of rent to rateable value of a property is not a concern for people when they choose to buy or rent.

4.4 Analysis 2

4.4.1 Empirical Results

This section compares the empirical results for the analysis of the relationship between age, income, marriage rate and homeownership rate with that of income and marriage rate on homeownership rate.

Dependent Variable: HR

Method: ML – ARCH

Sample(adjusted): 1 30

Included observations: 30 after adjusting endpoints

Convergence achieved after 5 iterations

	Coefficient	Std. Error	z-Statistic	Prob.
AGE	0.004002	0.000574	6.976917	0.0000
INCOME	4.80E-05	4.95E-06	9.686138	0.0000
MAR	0.007099	0.036496	0.194503	0.8458
LTV	0.185856	0.093472	1.988355	0.0468
RI	0.000128	0.000291	0.440899	0.6593
PRIME	-0.237107	0.154971	-1.530011	0.1260
C	-0.285109	0.109156	-2.611940	0.0090
Variance Equation				
C	0.000135	0.000573	0.236614	0.8130
ARCH(1)	0.149828	0.545741	0.274540	0.7837
GARCH(1)	0.599976	1.467635	0.408804	0.6827
R-squared	0.965197	Mean dependent var		0.367633
Adjusted R-squared	0.949536	S.D. dependent var		0.118507
S.E. of regression	0.026622	Akaike info criterion		-4.126312
Sum squared resid	0.014174	Schwarz criterion		-3.659246
Log likelihood	71.89467	F-statistic		61.62925
Durbin-Watson stat	1.296204	Prob(F-statistic)		0.000000

Table 4.2 Regression result with all the independent variables

Dependent Variable: HR
Method: ML – ARCH
Sample(adjusted): 1 30
Included observations: 30 after adjusting endpoints
Convergence achieved after 10 iterations

	Coefficient	Std. Error	z-Statistic	Prob.
INCOME	2.62E-05	4.24E-06	6.172190	0.0000
MAR	0.203423	0.030555	6.657682	0.0000
C	0.091974	0.180075	0.510752	0.6095
LTV	0.002539	0.169576	0.014975	0.9881
PRIME	-0.603386	0.183069	-3.295946	0.0010
RI	0.000362	0.000507	0.714801	0.4747
Variance Equation				
C	0.000360	0.000978	0.368412	0.7126
ARCH(1)	0.150590	0.429196	0.350865	0.7257
GARCH(1)	0.610091	0.794461	0.767930	0.4425
R-squared	0.900587	Mean dependent var		0.367633
Adjusted R-squared	0.862716	S.D. dependent var		0.118507
S.E. of regression	0.043909	Akaike info criterion		-3.197190
Sum squared resid	0.040488	Schwarz criterion		-2.776831
Log likelihood	56.95785	F-statistic		23.78007
Durbin-Watson stat	1.448574	Prob(F-statistic)		0.000000

Table 4.3 Regression result without the independent variable AGE

In order to compare the explanatory power when the independent variable AGE is absent, adjusted R^2 are compared. The adjusted R^2 for the relationship between age, income, marital status and homeownership rate is 0.950 (Table 4.2), while the adjusted R^2 for the relationship between income, marital status and homeownership rate is 0.863 (Table 4.3). With AGE as the independent variable, it explains better the homeownership rate than the one without AGE as the independent variable. Therefore, it can be argued that age is not

just a proxy for income level and marital status but has its own effect on homeownership rate.

4.4.2 Analysis of Results

The empirical results in this section are as expected. This supports the proposition that different age groups have different psychological perception on homeownership. One example is that younger people may find that renting is a more suitable tenure because the renters may not mentally or physically ready to cope with the trouble of looking after a house. The degree of mobility of different age differs provides an alternative explanation on the effect of age on homeownership. It is believed that mobility decreases with increase in age; and homeownership rate decreases with mobility, therefore homeownership rate decreases with age.

Therefore, homeownership rate cannot be explained solely by income level and marital status. This explains that age is not a proxy for income level and marital status and should be taken into account for the study of tenure choice.

4.5 Conclusion

This chapter tries to construct a regression model to analyze the impact of age, income and marriage rate on homeownership and the impact of age in addition to income and marriage rate on the homeownership rate in Hong Kong. The empirical results find that

age and income have a significant effect (99% confidence level) on homeownership rate in Hong Kong while marriage rate is not significant. However, marriage rate is significant at 99% confidence level when the independent variable age is removed. The coefficients of income, age and marriage rate (with the condition that AGE is removed) are positive, meaning that homeownership rate moves with income, age and marriage rate. On the other hand, the adjusted R^2 of the relationship between age, income, marital status and homeownership is higher than adjusted R^2 of the relationship between income, marital status and homeownership rate. This explains that the impact of age, income and marital status on homeownership rate is greater than that of income and marital status on homeownership rate. This shows that age is not just a proxy for income and marital status on homeownership.

CHAPTER 5

COMPARISON OF HOMEOWNSHIP PROFILES IN HONG KONG, THE US, AND CHINA

5.1 Introduction

In this chapter, the homeownership-age and homeownership-income pattern of Hong Kong, the US and China will be looked into. Homeownership-marriage rate pattern of the three places will not be studied as there is a lack of data. Detail analysis of the patterns will be provided in Chapter 6 and Chapter 7.

5.2 Homeownership-age Pattern

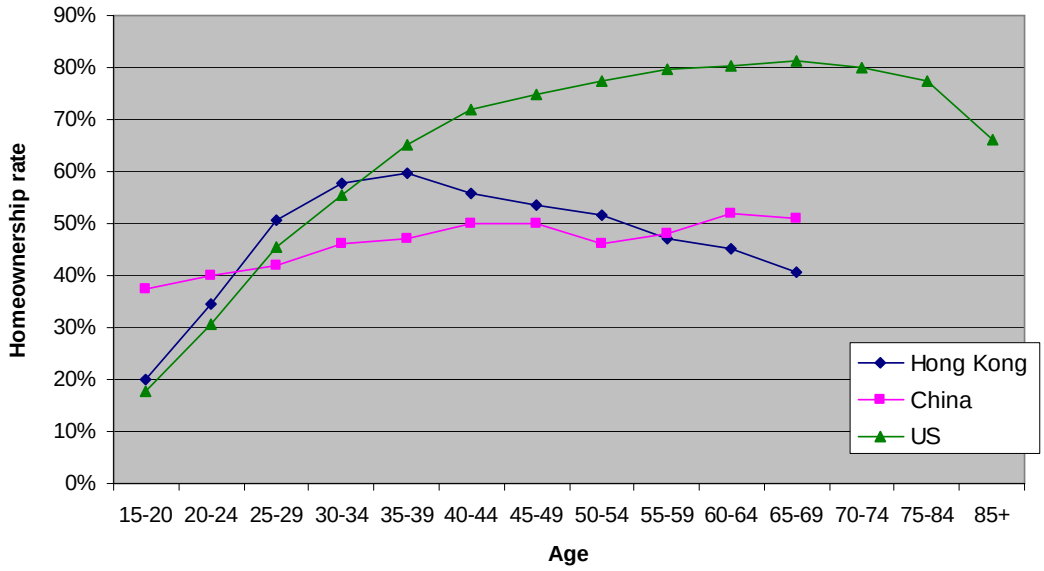

Fig 5.1 Homeownership rate by age in Hong Kong (2001)[1], the US (2000)[2] and China (1996)[3]

In comparing the homeownership-age curves (Fig. 5.1) of the three countries, it can be observed that the patterns of the homeownership-age curve are quite different. In China, the homeownership-age curve increases very steadily from early 20s to the age of 65+. The rate of homeownership among people in their early 20s in China is about twice as high as that in the US and Hong Kong. For the older age (65+) in China, the homeownership rate reaches 50%, which is much lower than that of the US and Hong Kong. In Hong Kong and the US, the patterns of curves are both concave in shape. In Hong Kong, the homeownership rate increased gradually for those aged 20-24 to a peak for those aged 35-39, then decreased gradually. While in the US, the peak of

[1] Source: Hong Kong Government, Census and Statistics Department (2001) *Population Census.* Hong Kong: Government Printer
[2] Source: US Census Bureau (2000) *US Census 2000.* The United States: US Census Bureau
[3] Source: National Bureau of Statistics in China (1996) *Census.* China: National Bureau of Statistics in China

homeownership rate occurs at the age of 65-69. The peak of homeownership in Hong Kong occurred much earlier than that in the US, about 30 years earlier.

From the previous literature review and empirical results, homeownership rate increases with age generally. Some scholars offered explanations that wealth accumulation and income increases with age, as homeownership increases with increase in wealth accumulation and income, thus homeownership increases with age. However, this argument is not able to explain the increasing homeownership with age in China. The homeownership rate in China does not increase with income; the detail of it will be explained in the next section. In addition, some researchers found out that older people tend to be less mobile and they tend to relocate less often than younger households. Therefore, they tend to own their own homes. However, it can be seen that both the homeownership rate in Hong Kong and the US deviates from the theory in the old age section. Another possible explanation concerns marital status, it is believed that married couples tend to own their own home, and marriage rate increases with age, as a result of which, homeownership increases with age.

5.3 Homeownership-income Pattern

Hong Kong in 1991

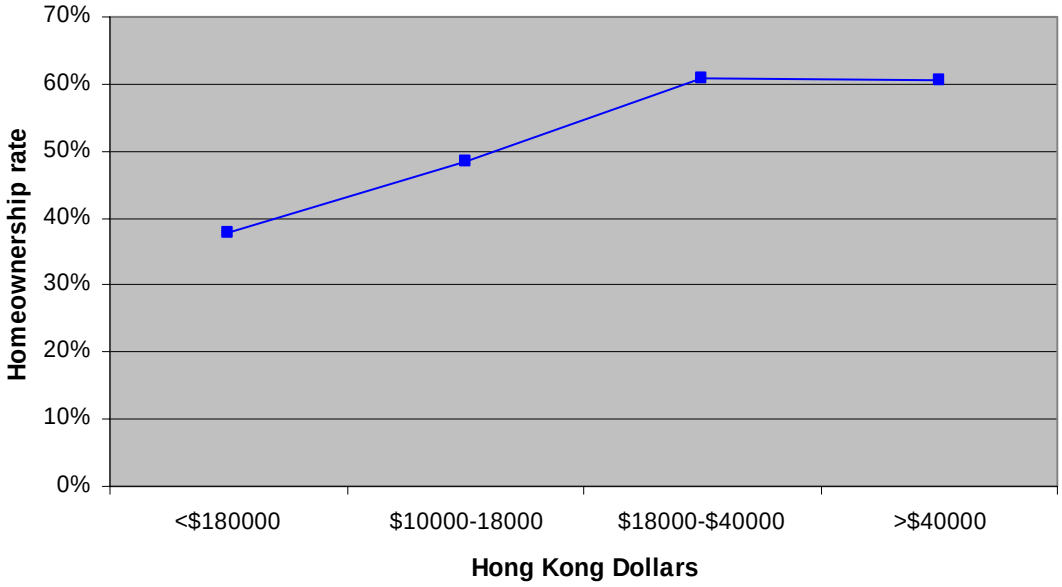

Fig 5.2 Homeownership rate by income in Hong Kong in 1991[1]

[1] Source: Hong Kong Government, Census and Statistics Department (1991) *Population Census.* Hong Kong: Government Printer

China in 1996

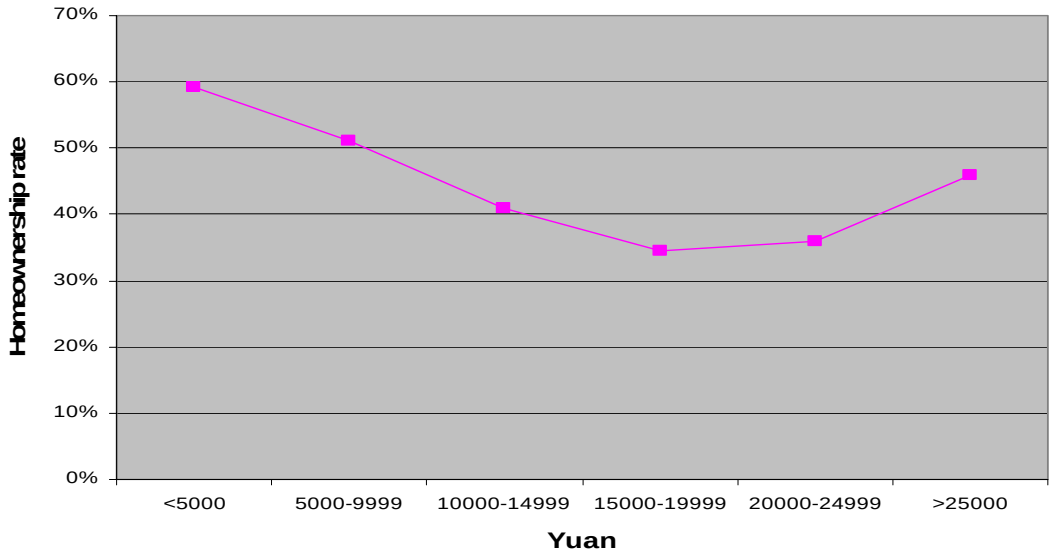

Fig 5.3 Homeownership rate by income in China in 1996[1]

The US in 2000

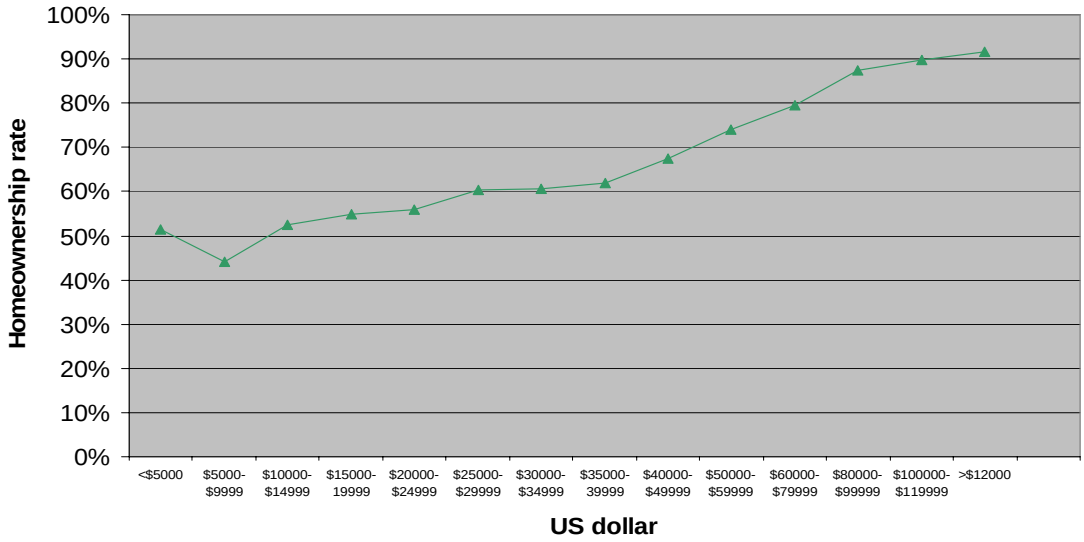

Fig 5.4 Homeownership rate by income in the US in 2000[2]

[1] Source: National Bureau of Statistics in China (1996) *Census.* China: National Bureau of Statistics in China

[2] Source: US Census Bureau (2000) *US Census 2000.* The United States: US Census Bureau

In comparing the homeownership-income curves of the three places (Figs 5.2, 5.3 & 5.4), it can be seen that the curve of China explicitly differs with that of the US and Hong Kong. In China, the relationship between ownership and income is curvilinear. The rate of ownership is higher among households with the lowest income and it is lowest among households with medium incomes. The rate of homeownership of China demonstrates a "V" shape with income.

In Hong Kong and the US, the homeownership rate generally increases with increase in income.

It can be seen that the theory of increase in affordability results in an increase in homeownership rate applies in Hong Kong and the US but not in China. Therefore, affordability cannot be an explanation to the homeownership-age pattern for China in the previous section and the homeownership-income pattern for China in this section.

5.4 Conclusion

Hong Kong and the US demonstrate a concave shape for homeownership-age while China demonstrates a steady increasing curve for homeownership-age. For homeownership-income pattern, Hong Kong and the US have a steady increasing curve in contrast with the "V" shape in China.

CHAPTER 6

ANALYSIS OF HOMEOWNERSHIP PROFILES IN HONG KONG, THE US, AND CHINA

6.1 Introduction

In this section, the homeownership-age and homeownership-income patterns are studied with reference to the principles derived from the literature review in Chapter 2 and empirical results in Chapter 4. Background information including ideology of the places, housing policies, institutional and regulatory framework of the three places are presented to supplement the unique situation in the three places.

6.2 Hong Kong

There have been rapid increased in homeownership rate in Hong Kong between 1982 and 1997. The increase in homeownership rates is impressive in both the public and private housing sectors, and overall. Between 1982 and 1997, ownership increased from 56% to 72% of private housing; and the public sector from 5% to 25%. Overall, homeownership increased from about one-third in 1982 to about half in 1997. Fig 6.1 shows the change in homeownership rate in the previous 20 years.

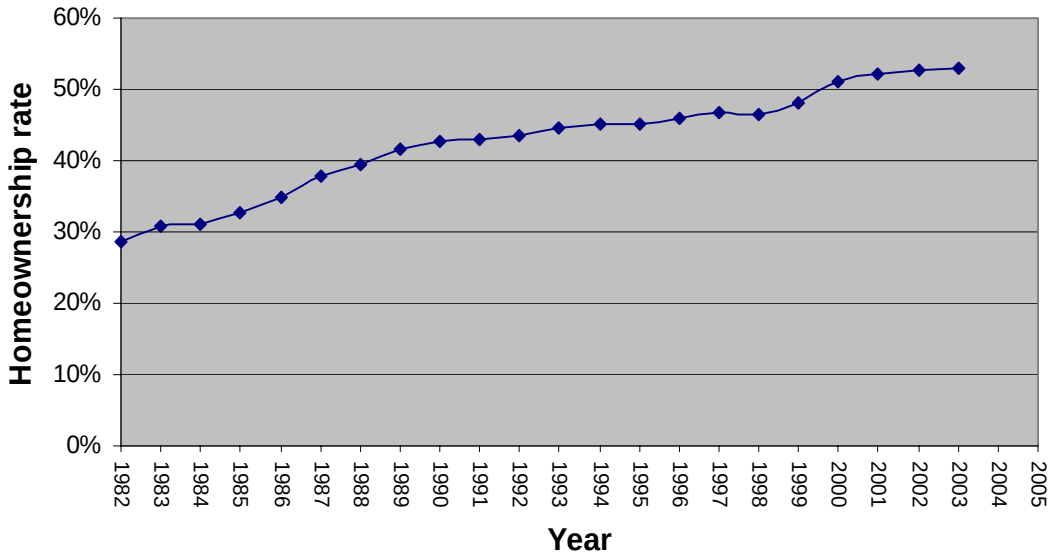

Fig 6.1 Homeownership rate in Hong Kong 1982-2003[1]

6.2.1 Ideology

Hong Kong is having market economies. Under market economies, people are given freedom of choice in the housing market. Residents can choose different tenures based mainly on personal preference and affordability. Housing is predominantly private and price is the major force driving housing provision and consumption, the government only provides some low-cost public housing to reduce the inequality generated by market mechanisms. Therefore, with private developers as the dominant housing provider, employers and the government have virtually no housing responsibility to their employees. The link between the employees and employers is mainly an economic

[1] Source: Hong Kong Government, Housing, Planning & Lands Bureau (2004) *Housing Statistic*. Hong Kong: Government Printer.

linkage, with the latter providing high wages and the former purchasing housing from the market.

6.2.2 Reasons for Increasing Homeownership-income Pattern

The increasing homeownership-income pattern (Fig 5.2) follows the principle of increasing affordability results in increasing homeownership proposed by different researchers in Chapter 2 and the empirical results in Chapter 4.

6.2.3 Reasons for Concave Homeownership-age Pattern

1) Income and Marriage Rate

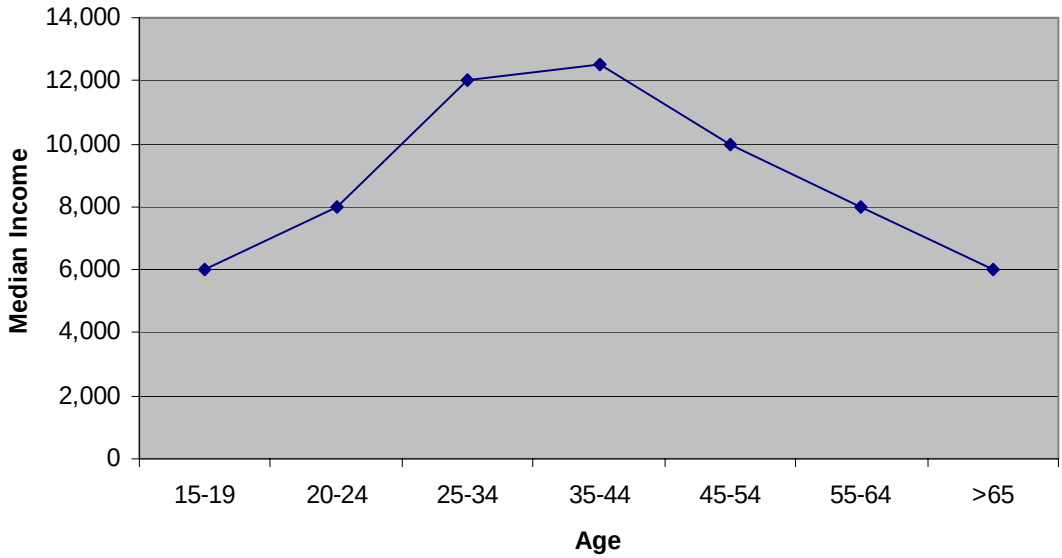

Fig 6.2 Median income by age in Hong Kong in 2001[1]

[1] Source: Hong Kong Government, Census and Statistics Department (2001) *Population Census.* Hong Kong: Government Printer

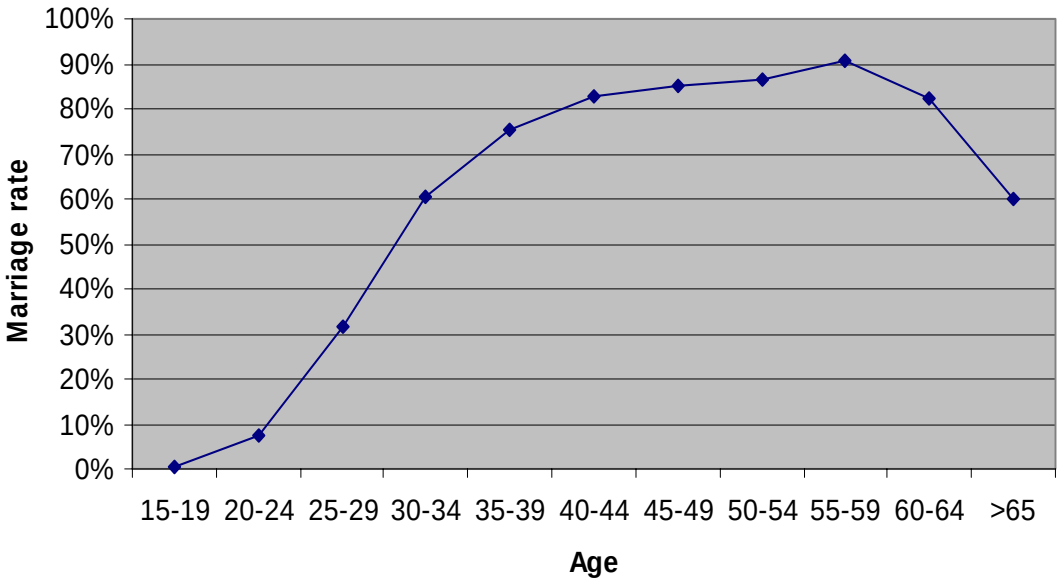

Fig 6.3 Marriage rate by age in Hong Kong in 2001[1]

It is observed that the income-age curve (Fig 6.2) and the marriage rate-age curve (Fig 6.3) have the same shape as the homeownership-age curve (Fig 5.1). As from the empirical results from Chapter 4, income and marriage rate are positively correlated with homeownership, therefore the concave shape of homeownership-age curve is a result of the concave shape of marriage rate-age and income-age curves. However, as it is proved that age is not solely a proxy of income and marriage rate in Hong Kong from the previous empirical results, therefore the homeownership-age curve is not identical to the combined shape of income-age and marriage rate-age curve.

[1] Source: Hong Kong Government, Census and Statistics Department (2001) *Population Census.* Hong Kong: Government Printer

2) Housing Polices

- *Public Rental Housing*

The Government has been providing assistance to low-income families who cannot afford private rental accommodation. Applicants of public rental housing i) have to undergo a comprehensive means test covering both income and net assets, ii) have at least seven years' residence in Hong Kong, and iii) possess no private domestic property. The public rental tenancies cannot be passed on automatically from one generation to the next. Public housing rent levels are determined on the basis of tenants' ability to pay. Therefore, the low income group is usually situated in public rental housing.

In 1998, the government has introduced the Tenant Purchase Scheme to promote affordable homeownership among public housing tenants by assisting them to buy their flats they currently rent. All prospective public housing tenants are offered the opportunity to buy public housing at subsidized prices. Public sector homeownership among the low-income group is thus enhanced.

Through the public rental housing policy, the low-income families are mostly accommodated in the public housing. However, as the new scheme to sell public housing has been introduced, low-income families are given greater chance to own their home.

- *Subsidized Homeownership*

There are a number of ways for subsidized homeownership; they are Home Ownership Scheme (HOS), Home Purchase Loan Scheme (HPLS), Home Start Loan Scheme (HSLS) and Sandwich Class Housing Program (SCHP). Since 1978, over 421,000 subsidized sale flats have been sold to families of low and middle income groups at discounted prices under the above schemes.

HOS was introduced in 1976 to promote homeownership among better-off public tenants and means-tested families in the private sector, families regarded as able to afford private renting but not purchase without assistance. This program was structured to facilitate ownership by making homeownership affordable to as many eligible families as possible. Prices of HOS were based on a discount of between 25 per cent to 50 per cent off estimated market prices for comparable private units, deferred until the property is sold, re-mortgaged or sub-let after the expiry of an initial 10-year resale restriction. However, in November 2002, the government decided to withdraw from its previous role as provider of subsidized sale flats and refrain from competing with the private residential market. Through HOS, homeownership rate is enhanced among the low to middle income groups.

The Government has implemented a SCHP targeted at families living in private rented accommodation with monthly incomes currently between $30,001 and

$60,000. The Program comprises a main scheme and a loan scheme. The loan scheme assists families to purchase their own homes in the private sector.

The government also introduced initiatives to promote private ownership with public assistance, in particular the HPLS and HSLS. They provide home purchase assistance towards down payment and related expenses, in the form of an interest-free loan or monthly mortgage subsidy, to those who cannot afford to buy a reasonable flat in the private market.

As government provides different forms of subsidy to the low to median income group to promote homeownership, people of lower income are exposed to greater opportunity of homeownership. Younger families or people usually have lower income which constraints them from entering the homeownership market. The policies aforementioned help people to acquire their own property at an earlier age.

3) Housing Policies for the Elderly

The government has several housing schemes that grant priority to the elderly. These schemes include Single Elderly Priority Scheme or the Elderly Persons Priority Scheme. The applicants must at least 58 years of age when filing in their applications and must have attainted the age of 60 by the time of allocation. Applicants must also pass the income and net asset value test.

Under the schemes, the elderly tends to move to the public rental housing because of the priority given to them. This results in a decrease in the homeownership rate.

4) Mortgage Market

In March 1997, the Government set up the Hong Kong Mortgage Corporation Limited (HKMC). The HKMC purchases mortgage loans from authorized banks and deposit taking companies, and will in turn issue mortgage-backed securities. Apart from enhancing banking and monetary stability and promoting development of the local debt market, the HKMC increases the amount of mortgage finance available to home buyers and thereby help boost the overall homeownership rate in the community. The developments of mortgage in Hong Kong helps the younger households enter the property market earlier, thus putting forward the peak for homeownership at an earlier age. It can be seen from Fig 6.4 that mortgage is most popular among the younger age households.

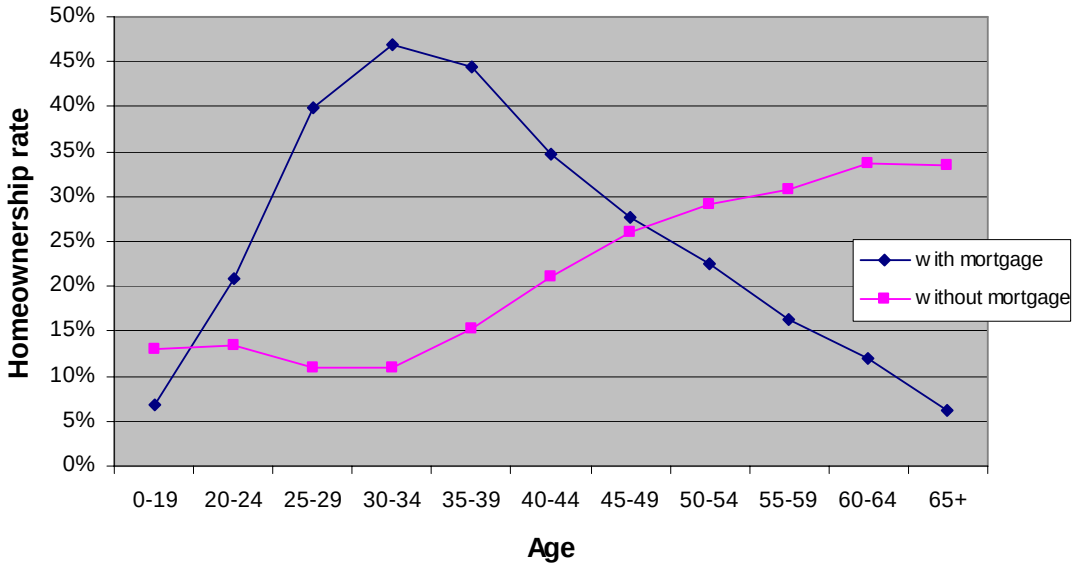

Fig 6.4 Homeownership rate-age of people with mortgage and without mortgage in Hong Kong in 2001[1]

6.2.4 Conclusion

The principle of affordability explains the increasing homeownership with income, which contains no deviation from the general principle.

From the empirical results in Chapter 4, income and marriage rate are positively correlated with homeownership rate. Therefore, the concave shape of homeownership-age follows the concave shape of income-age curve and marriage rate-age curve. The housing policies and the situation of the mortgage market have made home owning possible at an early age in Hong Kong, therefore contributing to the increasing

[1] Source: Hong Kong Government, Census and Statistics Department (2001) *Population Census.* Hong Kong: Government Printer

homeownership rate until the age range of 35-39. The housing policies for the elderly helps to explain the decrease in homeownership rate among the elderly, which is the last part of the curve.

6.3 The United States

The homeownership rate in the US fluctuated around the 45 percent level from 1890 to 1940 (Fig 6.5), rose rapidly from 1940 to 1960, and then increased slowly thereafter until 1980. Between 1980 and 1990 a decline was recorded. The national homeownership rate declined from 1980 to 1986, remained virtually unchanged through 1994, and then rose steadily from 1995 through 1999.

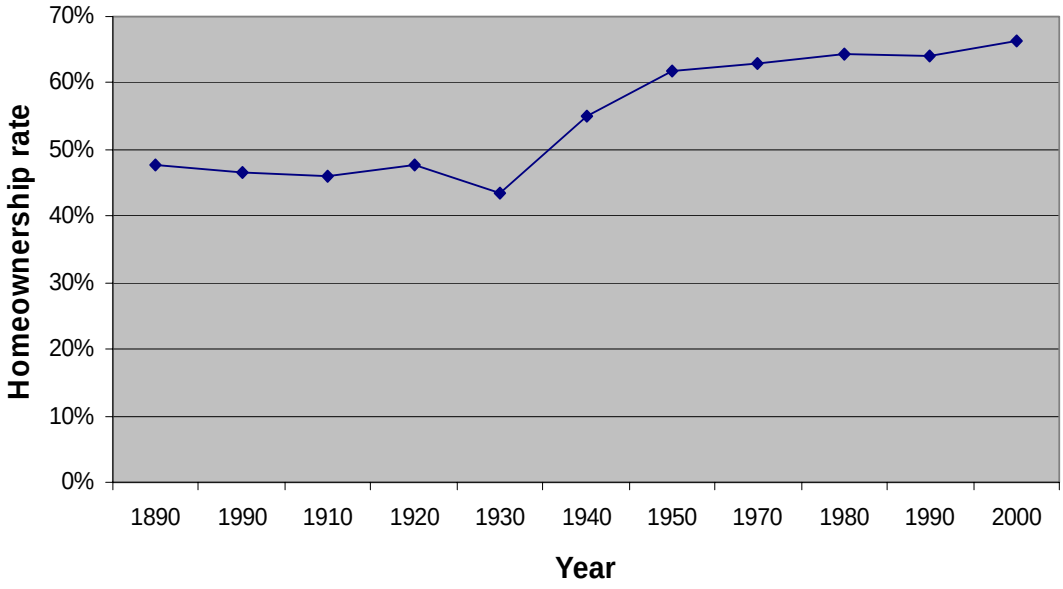

Fig 6.5 Homeownership rate in the US 1890-2000[1]

[1] Source: US Census Bureau (2000) *US Census 2000.* The United States: US Census Bureau

6.3.1 Ideology

The US is having market economies, which is the same as Hong Kong. Under market economies, housing is considered a commodity and households purchase housing with their wages. There is greater freedom of choice in the housing market. Residents choose different tenures based mainly on personal preference and affordability. In market economies, housing is predominantly private and price is the major force driving housing provision and consumption, while the government only provides some low-cost public housing to reduce the inequality generated by market mechanisms. Therefore, with private developers as the dominant housing provider, employers and the state have virtually no housing responsibility to their employees. The employees and employers is mainly an economic linkage, with the latter providing high wages and the former purchasing housing from the market.

6.3.2 Reasons for Increasing Homeownership-income Pattern

The increasing homeownership-income pattern (Fig. 5.4) follows the principle of increasing affordability results in increasing homeownership proposed by different researchers and the empirical results in Chapter 4.

6.3.3 Reasons for Concave Homeownership-age Pattern

1) Income and Marital Status

Generalized from the previous empirical results and empirical results from different researchers, homeownership rate correlates positively with income and marriage rate. Therefore, the concave shape of homeownership-rate is the same as the concave shape of income-age (Fig 6.6) and marriage rate-age curves (Fig 6.7). Further, it is observed that the peak of the income is about 10 years later than that in Hong Kong. This offers an explanation for the occurrence of the peak of homeownership 30 years earlier in Hong Kong than in the US.

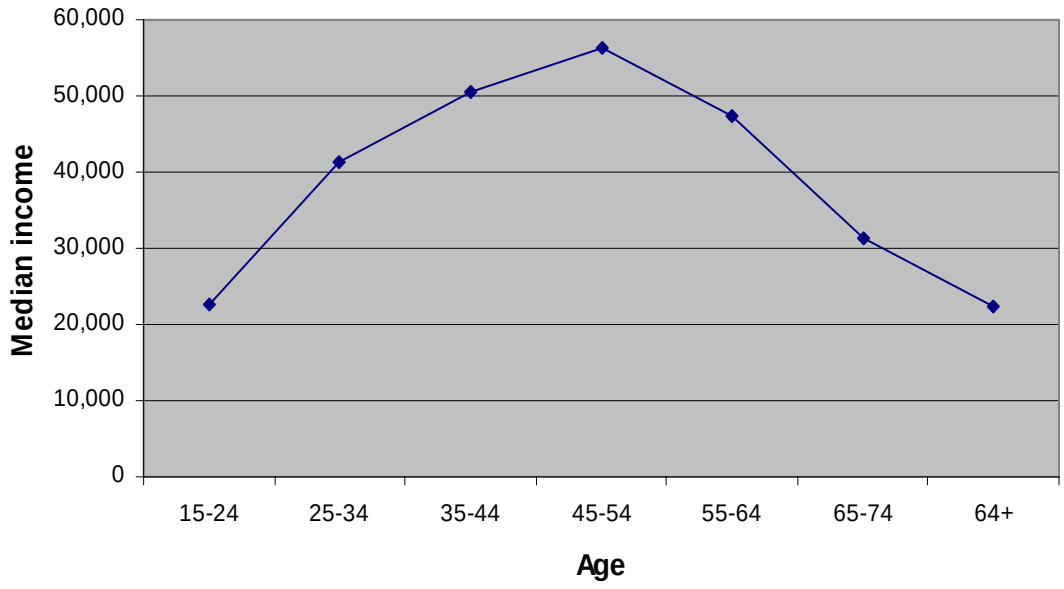

Fig 6.6 Median income and age in the US in 2000[1]

[1] Source: US Census Bureau (2000) *US Census 2000.* The United States: US Census Bureau

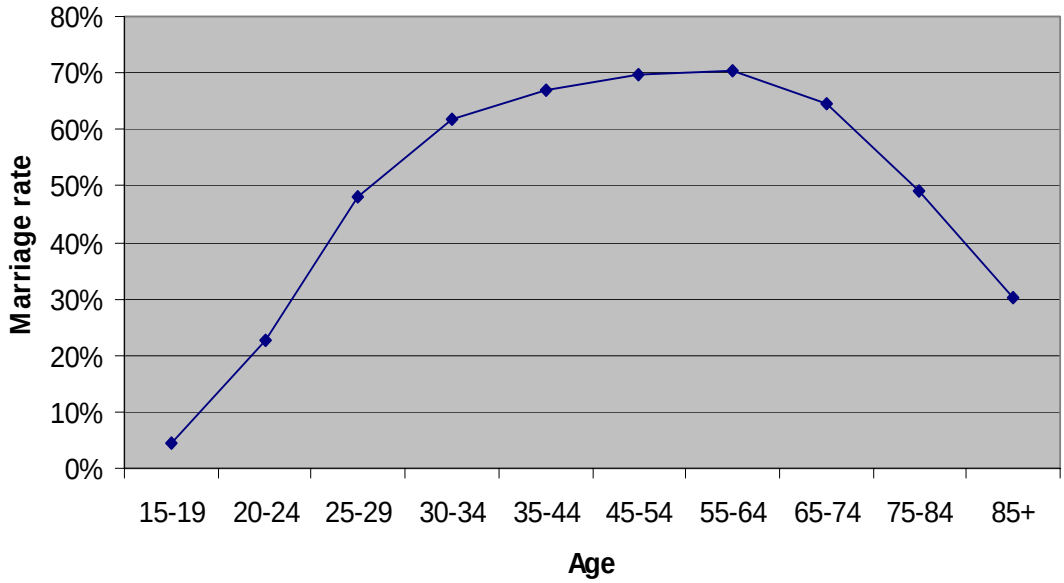

Fig 6.7 Marriage rate and age in the US in 2000[1]

2) Housing Policies

While there have been myriad of Federal program to promote homeownership, the focus will be on four in this section: i) Federal Housing Administration (FHA); ii) the Government-Sponsored Enterprise (GSE) status of the secondary mortgage market agencies; iii) the Mortgage Revenue Bond, and iv) the Mortgage Credit Certificate Program.

[1] Source: US Census Bureau (2000) *US Census 2000.* The United States: US Census Bureau

- *Federal Housing Administration (FHA)*

FHA has been a crucial program in helping people overcome capital constraints. It has allowed households with relatively few resources to enter the housing market with low down payments. FHA has traditionally been the mechanism used by borrowers who have difficulty obtaining mortgage financing in the private conventional market. It has long been recognized as the major source of funding for first-time, low-income, and minority home buyers.

- *Government Sponsored Enterprise (GSE)*

The existence of the secondary market agencies, on the other hand, unambiguously makes it more financially desirable for people to become homeowners. The fact that they can borrow money at preferred rates means that conforming mortgage rates are lower than they otherwise would be. The Federal Housing Enterprises Financial Safety and Soundness Act of 1992 affirmed and strengthened (The Department of Housing and Urban Development) HUD's role as mission regulator for Fannie Mae and Freddie Mac, the Government-Sponsored Enterprises (GSEs) in the secondary mortgage market. HUD's primary responsibility under this 1992 GSE Act has been the establishment of goals for the GSEs' purchase of mortgages for targeted groups of borrowers. These include low- and moderate-income (low-mod) families, families living in underserved areas, and special affordable families (very low-income families and low-income families in low-income areas).

- *Mortgage Revenue Bond*

The Mortgage Revenue Bond program raises many of the same issues as FHA and the special treatment of the GSEs. The program allows States to use tax-exempted bonds to finance mortgages for targeted borrowers and houses. As a result, at least some of the benefits of the program go to the investors in the bonds. At the same time, the program places eligibility limits on house prices and incomes. The income limit in many areas commendably targets the benefits of the program towards those on the margin of becoming homeowners.

- *Mortgage Credit Certificate Program*

The companion program to the Mortgage Revenue Bond program is the Mortgage Credit Certificate Program, which allows borrowers to credit mortgage interest against their Federal income taxes. This program is well designed, targeted, and certainly adds to the financial desirability of being a homeowner.

Same as the policies in Hong Kong, the policies in the US has helped the people acquire their own property at an earlier age. Therefore, these policies offer an explanation for the concave shape of the homeownership-age curve. The above policies, however, cannot offer an explanation for the difference in the age of occurrence of homeownership peak between Hong Kong and the US. This is

because in both Hong Kong and the US, they have more or less the same housing policies to promote homeownership.

3) Housing Policies for the Elderly

HUD creates a range of affordable rental housing opportunities for older Americans through public housing, project- and tenant-based rental assistance, multifamily mortgage insurance and interest subsidies, and capital advances for the development of low-rent senior housing. In this section, it will focus on the condition of the three largest single components of HUD-assisted rental housing for seniors: public and Indian housing, the subsidized multifamily housing stock, and Section 202, HUD's successful elderly housing production program. Together these programs provide housing security for an estimated 1.5 million senior households.

- *Public and Indian Housing*

In 1997 one-third of public housing's 1.32 million units were occupied by households headed by a person age 62 or older. A sizable percentage of these approximately 416,000 elderly households are in general-occupancy public housing.

- *HUD-Subsidized Multifamily Housing*

Elderly households occupy 44 percent of the units in HUD-assisted multifamily housing. For more than 30 years, HUD has encouraged private property owners to build, rehabilitate, and operate affordable rental housing through an array of programs that combine mortgage insurance with interest subsidies or that have project-based rental assistance.

- *Section 202 Housing*

Since 1959 Section 202 has supported the development of more than 350,000 units of affordable rental housing for elderly households. For almost 40 years, Section 202 has been an important component of the Nation's strategy for expanding affordable housing opportunities for low-income, elderly renters.

In respect of the policies provided to the elderly, elderly are adequately housed in rental housing. This provides the reason for the decreased in homeownership in very old age.

6.3.4 Conclusion

The principle of affordability explains the increasing homeownership with income. There is no deviation from the general principle.

From the empirical results in Chapter 4, income and marriage rate are positively correlated with homeownership rate. Therefore, the concave shape of homeownership-age follows the concave shape of income-age curve and marriage rate-age curve. The housing policies have made homeowning possible at an early age in Hong Kong, therefore contributing to the increasing homeownership rate until the age range of 65-69. The housing policies for the elderly help explain the decrease in homeownership rate among the elderly, which is the last part of the curve.

6.4 China

Housing tenure in urban China has experienced a zig-zag path in the past 50 years because of dramatic changes in ideology and political economy. It has changed from mostly private rental housing in the early 1950s, to virtually all public rental housing after the Socialist Transformation (1956-66) and the Cultural Revolution (1966-1976) and then to a mix of increasing homeownership and decreasing public rental housing since the housing reform starting in 1988. Before 1949, the majority of urban housing was private and the share of public rental housing was trivial because of the government's long-time involvement in war. In 1956, the state began to control private rental housing regarding allocation, rent standards, maintenance and management, while most landlords remained nominal owners who received rent from the state instead of from tenants. By 1964, 70 per cent of the private rental housing stock was transferred to public ownership. The Cultural Revolution continued the elimination of private ownership. A large amount of private housing was impounded and confiscated by the

state and government agencies. Since 1988, private housing and homeownership has been encouraged.

6.4.1 Ideology

China is having socialist to transitional economies. Under the transitional economies, the nature of housing is transforming from a welfare good to a commodity, however, there is a still a tendency for the employee to depend on the employers to provide welfare housing to them. Moreover, under the welfare-oriented housing systems, the government or government agencies provide most of the public housing. The number of public housing is so large that it is almost the only choice for the majority. After the transformation, the state no longer provides new housing and the people are given choice to purchase housing property.

6.4.2 Reasons for "V" Shape of Homeownership-income Pattern

The "V' shape of the homeownership-income pattern does not follow the general principles that homeownership rate increases with income derived from the literature review in Chapter 2 and empirical results in Chapter 4. Detail explanations for the "V" shape will be given in Chapter 7.

6.4.3 Reasons for Increasing Homeownership-age Pattern

1) Income and Marital Status

As there is a lack of data for the income-age and marriage rate-age in China, there is no conclusion reached for this point.

2) Housing Policies for the Elderly

There is basically no housing policy targeting at the elderly. As elderly are not provided with rental housing tailor-made to them, their desire for stability will induce them to stay in their owner-occupied housing. Therefore, the homeownership rate in the old age does not drop like that in Hong Kong and the US.

6.4.4 Conclusion

The homeownership-income demonstrates a “V” shape, which means that income is not a determining factor of homeownership in China.

As there is lack of data, the applicability of the principles that homeownership rate correlates positively with income and marriage rate cannot be tested in the case of China.

6.5 Conclusion

Both Hong Kong and the US comply with the general principle that homeownership increases with income while China does not. Moreover, in Hong Kong and the US, the principle that homeownership rate correlates positively with income and marriage rate are applicable to explain the concave shape of homeownership rate pattern. However, there is a lack of data to test the principle in China. However, there is a lack of data to test the principle in China.

CHAPTER 7

THE "V" SHAPE OF HOMEOWNERSHIP-INCOME CURVE IN CHINA

7.1 Introduction

In this section, special attention is paid to the "V" shape of homeownership-income pattern in China. Explanations are investigated and proposed.

7.2 Critical screening

Critical screening is applied to explain the homeownership profile in China; it is because of the unique "V" shape in China that requires in-depth study. China's unique homeownership rate-income has been explained by a lot of researches by the "socialist" or "transitional" economies, however, it is found that in other "socialist" or "transitional" countries, the homeownership rate-income pattern is not the same as that in China. One of the counter examples given is Germany. From Fig 7.1 it can be observed that the homeownership rate increases with income, it is different from the "V" pattern in China. Therefore, the ideology of socialist or transitional economies cannot be the reason for explaining the unique "V" shape in China.

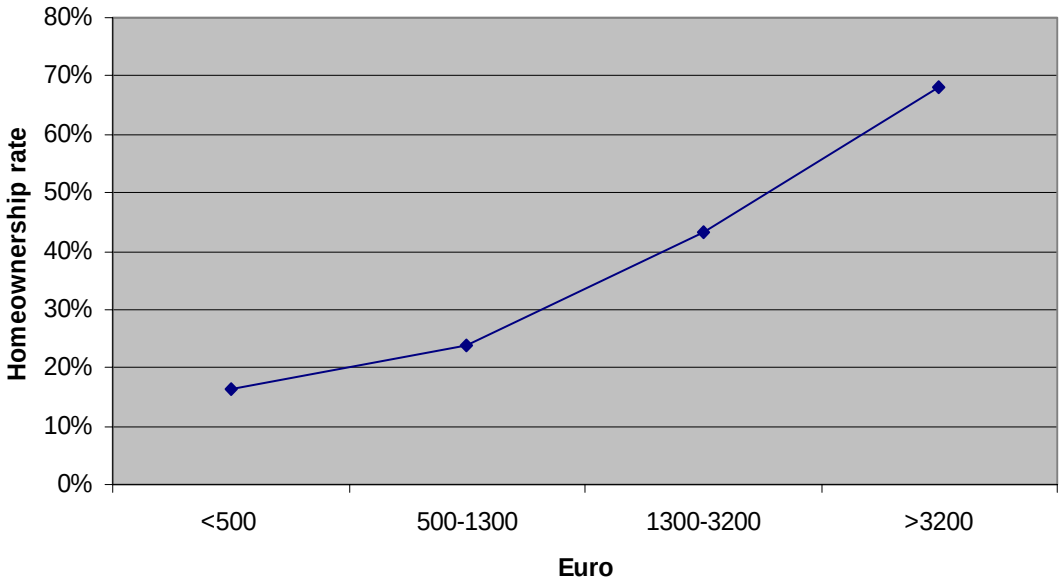

Fig 7.1 Homeownership-income pattern in Germany in 2002[1]

7.3 Reasons for "V" Shape of Homeownership-income Pattern

It is observed that the homeownership-income curve is not having a concave shape as that in Hong Kong and the US. Instead, the homeownership-income curve (Fig 5.3) in China is convex. It implies that homeownership rate increases with income proposed by researchers is not applicable in China.

[1] Federal Statistical Office Germany (2002) *Housing Statistics*. Germany: Federal Statistical Office Germany.

7.3.1 Provision of Public Housing by State-owned Enterprise and Government

Before the transformation in China, housing was considered a welfare benefit such that both employers and the state had the responsibility to provide the public housing with low rental. Therefore, housing was a welfare benefit that the state and state-owned enterprises provided to their employees who in turn were paid low wages without a shelter component. The allocation of housing was based on a queue system with those who have close relationships with the work unit listed at the top. Job rank and job seniority served as the indicators of the relationship between employees and work units. People with higher job rank and job seniority were more likely to access public housing and rental was the only possible tenure. After the transformation in China, there exists homeownership. The public housing provided by the state or the state-owned enterprise before are now sold to the people. However, for the state-owned enterprises with more resources are continued to provide public housing to their employees. Therefore, the employees who have high job-rank and job seniority, who are usually the middle-income class are still provided with public rental housing.

The above provides an explanation for the unusual relationship between age, household income and ownership. The households are affiliated to the public housing system in which age and income do not matter very much. Instead, the close housing relations among households, work unit and the state affect households' housing access and tenure choice. In addition, the rank of work units and a person's job rank and job security can affect tenure choice. In general, people working in higher-rank work units are less likely

to own as they are provide with subsidized rental housing. While people with the very high job seniority are more likely to own as they enjoy significant "job seniority discount" in housing sale prices, which obviously results in cheap prices and encourages homeownership. Thus, this can effectively explain the "V" shape in the homeownership-income pattern.

1) Reasons for State-owned Enterprise Providing Welfare Housing

The state-owned welfare housing contributes to the unique homeownership-income pattern; the unique pattern will not appear if state-owned enterprise provides housing allowance instead of providing public housing to the employees. Therefore, in this section, explanations of the reasons for state-owned enterprise to provide public housing will be examined.

Firstly, land supply for commodity housing and welfare housing is different. In accordance with China's Constitution, all land is owned by the state. Land-use right in practice is acquired by way of a grant or by means of allocation by the state. In the past, allocation of land-use right was the only way people can get land-use state from the state. Land-use rights were only allocated when the use was by the government, military action, state-owned enterprise or foreign investments. The land-use rights allocated usually incurred no costs and there was no limit on the duration of the land-use rights granted. After 1990, there is the granting of land-use rights by the state. If the land-use right is granted by the state,

the land-use right is subjected to a limited duration and certain costs are to be paid. After the land-use right is granted or allocated, the land-use right's holder may then exercise the right granted, but the land must be used in accordance with the land-grant contract. Therefore, the tenure choice before 1990 was very restricted. The employee relied very much on the enterprise to provide them with housing for a very long time. It is further argued that the cost for providing public housing by the state-owned enterprise is lower than that of providing housing allowance in monetary term, as the land allocated to state-owned enterprise is free of charge. Therefore, the state-owned enterprises have chosen to continue to provide public housing instead of housing allowances after 1990.

Secondly, it is related to the cash flow control of the enterprises. If the enterprises provide public housing to the people, they have to incur a lump sum for construction cost at the beginning. The state or banks will provide loans for this sum of money. The enterprises will then be able to receive rents from the tenants continuously. However, if monetary housing allowance is given, the expenditure will be a continuous out-flows of money. No loans are provided in this case. Therefore, from the viewpoints of view of state-owned enterprises, providing public housing is more advantageous than providing monetary housing allowance.

Moreover, there is tight state control on the wage and other forms of monetary rewards to the employees. Housing allowance is a means of monetary rewards which is therefore subjected to tight state control. As a result, the provision of

public rental housing had become an important means for the managers of state-owned enterprises to gain support from the workers. For example, people in rich enterprises may find government-set standards for cash subsidies too low to be attractive.

And if the state-owned enterprises provide housing allowance instead of providing public housing to the employees, the employer then loses the privileged in housing allocation. Providing public rental housing can impede the mobility of employee. The provision of public rental housing can ensure the employees are housed near work. This can further assure that the work units have good neighborhood relations.

By keeping the salaries low through providing public housing, the government can centralize housing costs for redistribution. In practice, the state did not always use the right proportion of income for housing. Income from public housing is not putting back into the public housing. With the emphasis on production, much of these housing funds were used for purposes other than housing. If housing allowances in monetary terms is used instead of providing public housing, the redistribution of income to other areas will not be possible.

All the reasons stated above contribute to the continuous provision of welfare housing by the state-owned enterprises to the employees.

7.3.2 Affordability

After the transformation in China, people are given the freedom of tenure choice; however, employees, especially the middle income group, are unwilling to give up their "right" to subsidized housing and continue to stay in the subsidized housing. For this phenomenon, it can be explained by affordability. After the transformation of housing market in China, the urban housing market is made up of three tiers. At the top of the market, commercial or "commodity" housing consists of luxury units. When they first came to the market in the early 1990s, these apartment blocks and villas were intended primarily for sale to members of the foreign business community. At the opposite end of the housing market is welfare or "benefit" housing, owned and maintained by public enterprises and institutions and leased to tenants at nominal rents. These apartments are generally cramped and poorly maintained, and often do not even have their own kitchen and bathroom units. And a lot of the low-income people, who still cannot afford the rent, are inhabited in poor condition self-built housing. Under these two extremes, the middle class cannot afford to buy commercial housing and is often not interested in the rundown apartments owned by the State enterprises. Therefore, they will not choose to buy back their housing rented by the state-owned enterprises, instead they will continue to enjoy the public housing provided by the state-owned enterprises with low rental. Therefore, the homeownership rate among the middle income group is particularly low.

7.3.3 Housing Policies

Homeownership in both the public sector and the private sector has been promoted through various methods. For example, subsidized prices are provided to encourage sitting tenants to buy public rental housing and private housing in China mainly for owner-occupancy.

"Affordable housing" is introduced targeting medium and low income households, and is only for sale and not for rent in principle. In addition, there is the "Anju Scheme" initiated in 1995. Under the Anju Scheme, with the approval from the central government, commercial banks provide construction loans and the local government provides free serviced land for developing low cost housing construction. The completed housing (Anju housing) will be sold without profit to the middle and lower income families. The households with poor housing conditions will get preferential rights to buy Anju housing.

The government housing policy has focused on promoting homeownership to middle and upper income groups. As a result, homeownership rate is higher among the low income group and the homeownership-income curve demonstrates a "V" shape.

7.4 Conclusion

The influence of the provision of public housing by state-owned enterprise, affordability and housing policies are used to explain the “V” shape of homeownership-income pattern in China.

CHAPTER 8

THE FUNDAMENTAL FACTOR OF TENURE CHOICE

8.1 Introduction

It has been observed that the hypotheses 1) and 3) stated in Chapter 1 apply in Hong Kong and the US but not in China. It implies that there are yet other dominating factors of tenure choice other than age, income and marital status in China. Therefore, age, income, marital status, government policies and the ideology of a particular place are not the fundamental criteria for one to buy a house. Although the "V" has been explained by explanations proposed in Chapter 7, they are the situations specific to China alone and have no explanatory power in other cases. Therefore, it is believed that there is one or more dominating factor that determines the tenure choice of the people universally.

8.2 Second-hand Housing Market

It is suggested that the transaction volume of the second-hand housing market is the fundamental factor of housing tenure choice universally. The second-hand housing market in Hong Kong, the US and China are investigated. Transaction volume of the second hand housing is used as a measure of how active the second-hand housing market is.

Date	Hong Kong		China		The US	
	Public	Private	Public	Private	Homes	Condominiums and Cooperatives
01/01/2000 - 31/12/2000	-	-	-	-	5,152,000	706,000
01/01/2001 - 31/12/2001	2,781	39,521	0	0	5,295,000	746,000
01/01/2002 - 31/12/2002	2,164	37,671	0	0	5,567,000	820,000
01/01/2003 - 31/12/2003	2,279	9,510[1]	0	26	-	-

Table 8.1 Transaction volume of second-hand market in Hong Kong, the US and China[2]

It can be observed from the Table 8.1 that the second-hand housing market in Hong Kong and the US is more active than China. There is clearly a lack of second-hand housing market in China. In addition, the second-hand private housing market is more active than the public second-hand housing market in Hong Kong. And the second-hand housing market for condominiums and cooperatives is more active than that of homes in the US.

[1] Record until April 2003.
[2] Source: Fannie Mae, Centaline in China and Hong Kong and Hong Kong Housing Authority and Housing Department.

8.3 Second-hand Housing Market in Hong Kong

8.3.1 Public Housing

There are two types of public housing in Hong Kong that are transacted in the second-hand housing market in Hong Kong; they are Home Ownership Scheme and Tenant Purchase Scheme. However, there are restrictions for these houses to be sold. The flat can only be sold after five years from the date of first assignment with the payment of land premium. These restrictions have reduced the volume of transaction in the second-hand market.

8.3.2 Private Housing

There is no restriction imposed on the transaction of the private housing in the second-hand market in Hong Kong.

8.3.3 Implications

The restrictions imposed on the public housing have inevitably reduced the number of transactions in the second-hand housing of the public housing. Homeowners of the public housing are mostly the low income group whereas the homeowners of the private housing are the middle to high income group. It can be seen that as the second hand housing market in the private sector is more active than the public sector, which means the second

housing market of higher income group is more active than the lower income group. And the homeownership rate of the high income group is higher than the low income group; therefore the presence of a second-hand housing is a reasonable explanation for the tenure choice in Hong Kong.

8.4 Second-hand Housing Market in the US

8.4.1 Condominiums and Cooperatives

Since the scheme offer public housing units for sale to low-income families is not adopted until March 11 2003, and went into effect April 10 2003, there is still no transaction record for the public housing. Apart from the public housing units, condominiums and cooperatives are provided to the low to middle income group to enhance homeownership.

8.4.2 Homes

The selling price of homes is higher than that of condominiums and cooperatives. Homes are offered to middle to high income group people. There is no restriction imposed on the transaction of homes in the second hand market in the US.

8.4.3 Implications

The transaction volume of the second-hand market for homes is higher than that of the condominiums and cooperatives. This also means that the second-hand market for the higher income group is more active than the lower income group. It can also be observed that the homeownership rate for high income group is higher than that of the lower income group. Therefore, it can be deduced that how active is the second-hand market is a determinant of homeownership rate.

8.5 Second-hand Housing Market in China

8.5.1 Public Housing

There are a lot of factors inhibiting the development of second-hand housing market in China. One of which is that the tradition of housing maintenance in China is not well developed among the Chinese population. Therefore, second hand property are often in very poor condition and the cost of remedying such poor condition simply adds to the cost of homeownership which results in inhibition of the development of the second hand housing market. On the other hand, there are a number of restrictions imposed on the public housing selling to the middle income group. Public housings are sold to the sitting tenants at market price, subsidized price and cost price. Housing is sold to the high income group at the market price, to the middle income group at the subsidized price, while to the lower income group at the cost price. In the past, owners who purchased their

flats at subsidized prices were the middle income group, they cannot release their flats on the market and profit from them in the first five years. Although the five-year limit was abolished later, yet, a flat purchased at subsidized price is still not allowed to be released on the market. When they are on the market, the housing bureau or work unit, the original provider, has priority to buy or rent them back. The gains from the transition must be shared between the housing bureau or work unit and individual owner according to their contributions for the original purchase. In addition, owners have to obtain a license from the local government in order to sublease their housing legally. These restrictions, as well as high transaction costs and the heavy bureaucracy involved, discourage most owners of the middle income group from subletting and subleasing. In contrast, there is no resale restriction imposed on the public housing being sold to the low income and high income group people.

8.5.2 Private Housing

There is no restriction imposed on the transaction of the private housing in the second-hand market in China. And people who can afford the private housing are mainly the high income group.

8.5.3 Implications

The resale restrictions imposed on the public housing for the middle-income has induced the low homeownership rate of the middle-income group. This clearly showed that

second-hand market is a fundamental determinant of tenure choice. In contrast, there is no restriction in the transaction of the low-income housing and the commodity housing, and therefore, the homeownership rate of these two groups of people is relatively higher. However, as the privatization of housing in China is still a new concept, therefore the second-hand market is not yet developed in China, and no transaction record can be shown in Table 8.1.

8.6 Conclusion

It is evidenced by the restrictions and the transaction volume of the second-hand markets of the three places that second hand market is the fundamental determinant of tenure choice. Second-hand housing is important for homeownership in that the inability to sell means that people cannot make capital gains and changes in their lives cannot be accommodated by moving house. According to Wu (2004), the purpose of moving house is mainly to reduce long distance commuting, usually because of a change in workplace. As change in workplace occurs almost at least once to twice in every people's life, it is important that there is the presence of the second-hand market to ensure residential mobility before one owns. The lack of a second-hand housing market reduces residential mobility considerably and makes capital accumulation difficult. And the limited residential mobility results in reduction in the flexibility in peoples' lives. Therefore, it is concluded that how active a second-hand market is the fundamental determinant of homeownership that can be generally applied to every place in spite of the income, age, marriage rate profiles, ideology and housing policies of the place.

CHAPTER 9

CONCLUSION AND LIMITATIONS

9.1 Conclusion

In respect to the five hypotheses listed in Chapter 1, they are tested in the case of Hong Kong, The US and China.

Hypothesis 1) is proved to be correct in China only. In Hong Kong and the US, they have demonstrated a concave shape for the homeownership-age pattern.

Hypothesis 2) is proved to be correct in Hong Kong and the US, homeownership increase with income. However, the shape of the homeownership-income is “V” in China.

Hypothesis 3) is only tested in Hong Kong since there is a lack of data. It is proved that homeownership rate increases with marriage rate.

Hypothesis 4) is only tested in Hong Kong since there is a lack of data. It is proved that the age is not solely proxy for marriage rate and income level.

Hypothesis 5) is proved to be correct in Hong Kong, the US and China. Homeownership rate increases with the transaction volume of the respective second-hand housing market.

The first part of the dissertation mainly focuses on the tenure behavioral in Hong Kong. As emphasized in previous studies, income and marital status are the determinants of tenure choice. Income indicates the affordability of a household and marital status represents the wants and needs of a changing family structure. By using Multiple Regression Method, homeownership rate is regressed against income and marriage rate. It is found that income and marriage rate (with the condition that AGE is removed) correlate positively with homeownership rate.

Age is another important determinant of housing tenure choice, yet its importance is only recognized on the fact that it acts as a proxy for income and marital status. Many of the previous researchers can only recognize age as a proxy for income and marital status, but not the effect of age independently. It is claimed by a minority of researchers that age has some psychological effect and life cycle effect that should be taken into consideration. Multiple Regression Method is used to determine the effect of age on homeownership rate. Two empirical studies are done, one with the independent variable AGE and one without. The coefficients of determination (R^2) of the two models are compared to find out the explanatory power of age on homeownership rate. It is found that the R^2 of the empirical study that with the independent variable AGE is greater than that of the one without the independent variable AGE. It has thus proved that the effect of age is not just a proxy for income, but has its own effect on homeownership. The effects of age maybe a psychological one, such as one's readiness to take care and maintain a home.

Further to the study of tenure choice in Hong Kong, the tenure choice of different places is investigated, they are Hong Kong, the US and China. These three places are chosen because of the availability of data, and more importantly, the theories and concepts purposed by the previous researchers often apply to western countries only. Therefore, the aim is to investigate if the theories proposed by the researchers are generally applicable to all places. As the determinant income proposed by the researchers does not apply to the case of China. An in-depth discussion on homeownership pattern in China is carried out. However, the explanations deduced from the discussion in China are specific to China only. Therefore, further researches into the fundamental determinant of tenure choice that can be generally applied are investigated. Transaction volume of second- hand housing market is found out to be the explanation for the tenure choice that can be generally applicable in different places. The presence of second-hand housing market is important to enable the mobility and change of life style during the life course of a people. The change of life style includes the change of occupation which is not a rare phenomenon. Therefore, whether one will buy a house depends greatly on whether the second-hand market is active or not. And this concept is evidenced to be applicable to the three places, which include western and eastern countries.

9.2 Limitations of Study

9.2.1 Limitation of Variables

In the part of the empirical study, some factors are not considered; some examples are education level and employment rate. They are not incorporated into the model due to the limitation of resources. In connection with the limitations of the study, it is suggested that more determining factors should be incorporated for further study of the topics of housing tenure choice.

9.2.2 Limitation of Data

Limitation of data is always the greatest constraint of research study, the same case applies to this study. The aim of this study is to investigate the impacts of household's socio-demographic variables to housing tenure choice in Hong Kong. In order to ensure the data are coming from the same source, the only available source of data information is from Population Census or Population Bi-census from the Census and Statistical Department of Hong Kong. And the survey is conduced only once every five years. However, Hong Kong's economy changes rapidly and a five years interval is long enough for a lot of factors to change. Hence, it is suggested that further research should be carried out with annual data every consecutive year so that housing behavioral patterns of Hong Kong people can be updated.

For the part of studying tenure choice in the US and China, the data are from their national statistics Bureau, however, there are some data not available, such as the homeownership rate-tenure choice in China and the US. This has reduced the explanatory power of the determinants on tenure choice.

9.2.3 Exclusion of Joint Effects of Socio-demographic Variables

As can be observed from the equation, only uni-variables are taken into consideration in the empirical studies. The joint effects of the socio-demographic variables on tenure choice are ignored in this study. Housing decision is actually a complex choice and it is an outcome of interactions of different factors, hence a more comprehensive estimation of household's tenure behavioral pattern can be established.

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APPENDIX I

OBS	HR	AGE	INCOME	MAR	PRIME	RI	LTV
2001	0.27	19.50	7021.52	0.041	0.060	95.40	0.7
2001	0.54	29.50	12000.00	0.467	0.060	95.40	0.7
2001	0.58	39.50	12500.00	0.789	0.060	95.40	0.7
2001	0.53	49.50	10000.00	0.859	0.060	95.40	0.7
2001	0.46	59.50	8000.00	0.863	0.060	95.40	0.7
2001	0.41	70.00	6000.00	0.569	0.060	95.40	0.7
1996	0.24	19.50	6969.55	0.058	0.088	119.00	0.7
1996	0.48	29.50	9898.79	0.534	0.088	119.00	0.7
1996	0.51	39.50	9898.79	0.843	0.088	119.00	0.7
1996	0.46	49.50	8908.91	0.884	0.088	119.00	0.7
1996	0.40	59.50	6929.15	0.836	0.088	119.00	0.7
1996	0.35	70.00	5048.38	0.599	0.088	119.00	0.7
1991	0.23	19.50	6344.70	0.065	0.095	82.40	0.9
1991	0.45	29.50	8931.51	0.580	0.095	82.40	0.9
1991	0.48	39.50	8931.51	0.860	0.095	82.40	0.9
1991	0.44	49.50	7442.92	0.897	0.095	82.40	0.9
1991	0.38	59.50	5954.34	0.826	0.095	82.40	0.9
1991	0.34	70.00	4465.75	0.576	0.095	82.40	0.9
1986	0.14	17.00	4095.16	0.013	0.075	42.93	0.9
1986	0.24	24.50	6169.27	0.324	0.075	42.93	0.9
1986	0.35	34.50	7519.04	0.808	0.075	42.93	0.9
1986	0.40	44.50	6958.83	0.898	0.075	42.93	0.9
1986	0.41	54.50	6035.04	0.853	0.075	42.93	0.9
1986	0.38	60.00	4640.71	0.601	0.075	42.93	0.9
1981	0.11	17.00	3792.31	0.023	0.174	41.73	0.9
1981	0.19	24.50	5451.90	0.350	0.174	41.73	0.9
1981	0.28	34.50	6672.08	0.821	0.174	41.73	0.9
1981	0.32	44.50	6212.53	0.890	0.174	41.73	0.9
1981	0.33	54.50	5335.99	0.842	0.174	41.73	0.9
1981	0.31	60.00	4037.64	0.606	0.174	41.73	0.9

Data for the Multiple Regression Model[1]

[1] Source: Hong Kong Government, Census and Statistics Department (1981, 1986, 1991, 1996 & 2001) *Population Census.* Hong Kong: Government Printer

APPENDIX II

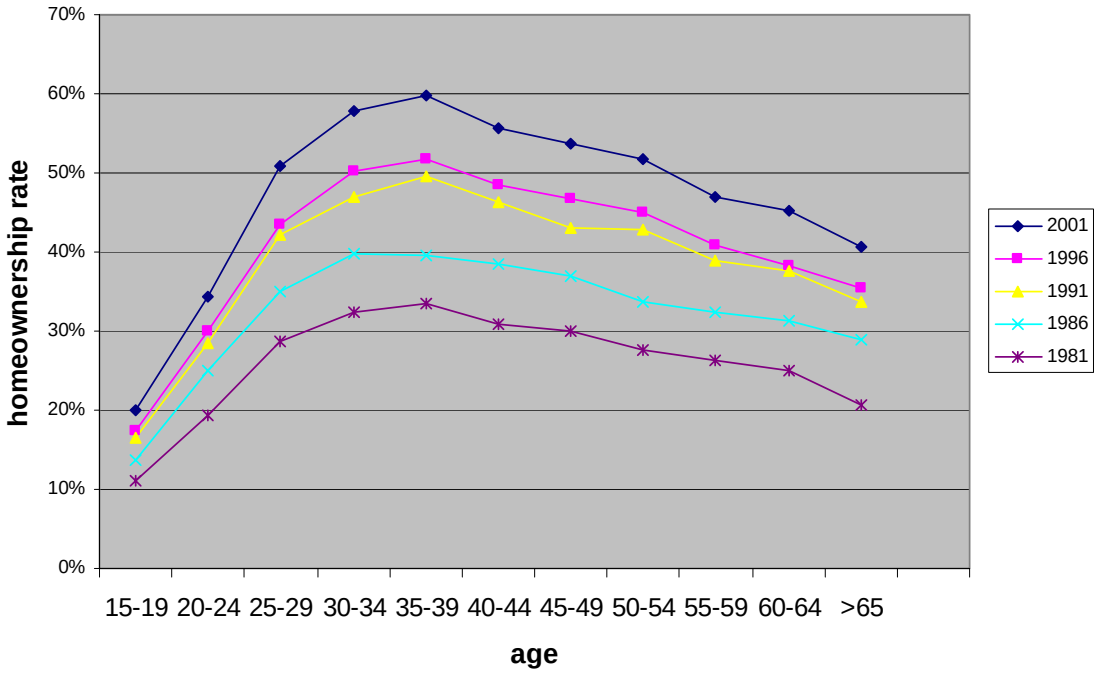
October 1999 – September 2000 = 100

	Composite CPI	**CPI (A)**	**CPI (B)**	**CPI (C)**
	Index	Index	Index	Index
1975	N.A.	18.2	18.4	16.4
1976	N.A.	18.8	19.1	17.1
1977	N.A.	19.9	20.2	17.9
1978	N.A.	21.1	21.4	19
1979	N.A.	23.5	23.8	21.3
1980	N.A.	27.2	27.4	24.5
1981	30	31	31.1	27.6
1982	33.3	34.3	34.4	30.9
1983	36.6	37.7	37.8	34.1
1984	39.8	40.7	41	37.1
1985	41.2	42	42.5	38.6
1986	42.6	43.2	43.8	40.4
1987	45.1	45.6	46.1	43
1988	48.6	49	49.5	46.8
1989	53.6	54	54.4	51.9
1990	59	59.2	59.7	57.7
1991	65.7	66.1	66.3	64
1992	72	72.3	72.7	70.3
1993	78.3	78.4	79.1	76.9
1994	85.2	84.8	85.9	84.6
1995	92.9	92.1	93.7	92.6
1996	98.8	97.6	99.7	98.6
1997	104.5	103.2	105.5	104.6
1998	107.5	105.9	108.5	107.9
1999	103.2	102.5	103.4	103.9
2000	99.4	99.5	99.4	99.3
2001	97.8	97.8	97.7	97.8
2002	94.8	94.7	94.7	95.1

Consumer Price Index[1]

[1] Source: Hong Kong Government, Census and Statistics Department (1975-2002) *Economics Indicators.* Hong Kong: Government Printer

APPENDIX III



Homeownership rate by age in Hong Kong[1]

[1] Source: Hong Kong Government, Census and Statistics Department (1981, 1986, 1991, 1996 & 2001) *Population Census.* Hong Kong: Government Printer

APPENDIX IV

Household Income (Yuan)	Homeownership rate
<5000	59.30%
5000-9999	51%
10000-14999	41%
15000-19999	34.40%
20000-24999	36%
>25000	45.90%

Homeownership rate by household income in China in 1996[1]

Household income (US$)	Homeownership rate
<$5000	51.35%
$5000-$9999	44.05%
$10000-$14999	52.38%
$15000-19999	54.98%
$20000-$24999	55.82%
$25000-$29999	60.35%
$30000-$34999	60.69%
$35000-39999	61.93%
$40000-$49999	67.33%
$50000-$59999	73.97%
$60000-$79999	79.54%
$80000-$99999	87.49%
$100000-$119999	89.66%
>$12000	91.55%

Homeownership rate by household income in the US in 2000[2]

[1] Source: National Bureau of Statistics in China (1996) *Census.* China: National Bureau of Statistics in China

[2] Source: US Census Bureau (2000) *US Census 2000.* The United States: US Census Bureau

APPENDIX V

Period	No. of domestic households ('000)	Average domestic household size	Owner-occupiers as a proportion of total number of domestic households (%)
1982	1 311.6	3.9	28.7
1983	1 334.3	3.9	30.7
1984	1 378.7	3.7	31.2
1985	1 417.7	3.7	32.8
1986	1 473.1	3.6	34.9
1987	1 496.1	3.6	37.9
1988	1 532.6	3.6	39.4
1989	1 549.0	3.6	41.6
1990	1 559.0	3.5	42.6
1991	1 601.9	3.5	43.1
1992	1 633.5	3.4	43.5
1993	1 677.7	3.5	44.6
1994	1 729.1	3.4	45.1
1995	1 783.0	3.4	45.2
1996	1 864.5	3.4	45.9
1997	1 922.8	3.3	46.7
1998	1 961.5	3.3	46.6
1999	1 998.9	3.3	48.2
2000	2 037.0	3.3	51.1
2001	2 078.4	3.2	52.2
2002	2 133.7	3.2	52.6

Homeownership rate in Hong Kong 1982-2002[1]

[1] Source: Hong Kong Government, Housing, Planning & Lands Bureau (2004) *Housing Statistic*. Hong Kong: Government Printer.